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## CHAPTER 2 EXTERNAL DISEASE

### Introduction

Since the anterior part of the sclera, the cornea, conjunctiva, lids and lacrimal apparatus are so intimately related structurally and functionally, it is not surprising to find that pathological processes affecting any one of these structures frequently have important effects on the others. We shall therefore consider them together under the general heading of 'External Diseases', an area of ophthalmology of importance to the general physician as well as to the ophthalmologist. The majority of the common disorders in this area fall naturally under the headings of 'trauma', 'inflammation', 'neoplasia' and 'miscellaneous'.

#### A. TRAUMA

##### 1. Lid lacerations

Lacerations of the lids usually occur from broken glass, often as the result of car accidents. Lacerations parallel to the lid margins, in the skin lines, are no problem and heal with little scarring after closure with fine sutures (6-0 silk). Lacerations perpendicular to and through the lid margin present special problems and should be referred for the attention of an ophthalmologist. Unless sutured in layers with special attention to the margin, subsequent 'notching' of the lid may occur, producing corneal irritation and damage. This necessitates additional surgery.

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Lacerations of the medial part of the lids may involve the canaliculi. A careful search should be made for possible injury to the canaliculi in any laceration involving this area of the lids, especially the lower lid. In the event of a torn canaliculus special techniques are required to oppose the cut ends to permit correct healing. Improper healing with obstruction of the inferior canaliculus will result in a chronically 'tearing' eye, which is most distressful for the patient and particularly difficult to reconstruct at a later date.

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Pross 4 17

Lacerations of the upper lid above the tarsal plate may result in injury to the levator muscle of the lid. If these injuries are not recognised and repaired, ptosis may result. Secondary repair is then required. It is also imperative with a deep laceration to ensure that the globe itself is not lacerated. The eyelid must be gently

everted and the bulbar conjunctiva and sclera meticulously examined for evidence of injury. This is particularly important with stab injuries of the eyelids. X-ray of the orbital walls must also be undertaken to exclude intracranial injury.

## CORNEA 2.

### Corneal abrasions

#### Blunt trauma

Mild, blunt trauma to the cornea easily scrapes the epithelium and dislodges it from Bowman's membrane. The resulting abrasion is extremely painful but usually heals very rapidly (within hours), initially by the sliding of adjacent epithelial cells to cover the defect, later by proliferation of new cells from the basal epithelial layer. Complete healing occurs in about three weeks. Fluorescein drops readily identify small abrasions i.e. they fluoresce.

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### UVL

Exposure to ultraviolet light (sun-lamps, welding flash, sun or snow) may produce painful disruption of the corneal epithelium.

Eyes with mechanical or radiant abrasions are much more comfortable when closed and immobile, and are best treated by patching, i.e. a firm pad over the eye, secured in place by a bandage. In some cases it is necessary to patch both eyes to prevent the movement of the involved eye behind the closed lid. Topical antibiotic ointment may be used prior to patching as prophylaxis against infection. Preliminary use of a topical anaesthetic will immediately relieve the severe pain associated with corneal abrasion and is frequently necessary to allow an adequate examination. Topical anaesthetics should never be prescribed for use by the patient at home, however, as they retard healing and give the patient a false sense of improvement.

### Exposure keratitis

Exposure of the cornea to the air for long periods of time without blinking causes another type of epithelial damage called exposure keratitis. Initially only the epithelium is involved and the condition is completely reversible with proper treatment. Should inadequate protection of the cornea continue, ulceration, and later, scarring and opacification of the stroma may supervene, leading to significant visual loss. Exposure keratitis is particularly likely to occur in comatose patients or those under prolonged general anaesthesia, whose lids are not completely closed. Copious applications of ointment (e.g. chloramphenicol) to the eyes of such patients are necessary to protect the corneas. If necessary the eyelids may be temporarily sutured together. A particularly fulminant ulceration of the cornea occurs when anaesthesia of the cornea co-exists with paralysis of the eyelids (e.g. in an acoustic neuroma, or following trauma). In such cases it may be necessary to permanently close the lids partially by creating surgical

adhesions between them (tarsorrhaphy). Alternatively botulinum toxin may be used to induce a temporary ptosis.

### 3. Foreign bodies

#### Low velocity

Under most circumstances the eyelids, the blink reflex, and the tear film combine to protect the eye from minor trauma. Low velocity foreign bodies (such as debris blown by the wind) striking the eye may only indent the conjunctival or corneal epithelium slightly and may be dislodged by the patient's blinking or by the physician using a cotton-tipped applicator (after topical anaesthesia). Once dislodged, foreign bodies are usually washed out by the tears.

#### Subtarsal sulcus

Frequently, however, small foreign bodies become entrapped beneath the upper lid in the subtarsal sulcus. With each blink such a foreign body is drawn down across the cornea, causing very severe discomfort, and linear corneal abrasions. These subtarsal foreign bodies are usually easily removed with a cotton-tipped applicator after everting the lid. All physicians must be accomplished at everting the upper eyelid. Tiny foreign bodies such as thorns, corn husks, and other vegetable matter may become lodged in the tarsal conjunctiva or in the loose conjunctiva immediately above the tarsus. They are then extremely difficult to see even with high magnification. The presence of such a foreign body should be suspected when vertical scratches are seen in the corneal epithelium. These scratches may be more easily detected by staining the cornea with fluorescein, a harmless dye which temporarily stains the corneal stroma when it is not protected by a layer of epithelium.

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#### Moderate velocity

A small foreign body striking the cornea with moderate velocity (metallic particles from a grinding wheel or from pounding metal on metal) frequently stops after penetrating partially into Bowman's membrane. Such a foreign body cannot be wiped away by the patient's upper lid and causes relatively mild pain each time the upper lid moves across it during a blink. Corneal foreign bodies are most easily removed with the point of a hypodermic needle (after topical anaesthesia). Where possible the exact depth of the foreign body in the cornea should be ascertained under magnification at the slit lamp.

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### SLIDE 22

#### Ferrous bodies

Ferrous corneal foreign bodies rapidly produce rust staining of the adjacent cornea. At the time of removal of the foreign body, the stained area (Bowman's membrane and occasionally stroma) is scraped away. If this is not done the eye may remain irritable and slightly congested and the epithelial defect may fail to heal. Removal of

*Scraping usually done at removal of FB.*

this stained corneal tissue is best done at the slit lamp and may be deferred by the general practitioner if consultation with an ophthalmologist is available. The stained area is actually easier to remove after a delay of several days which allows partial softening and separation from adjacent normal tissue.

#### SLIDE 23 *high velocity*

*no pain*  
When there is a history of a small, high velocity foreign body (particularly from pounding metal on metal, e.g. hammer and chisel) striking the eye and no foreign body is found by the physician, the possibility of penetration into the eye i.e. intraocular foreign body should be carefully considered. Examination with the slit lamp frequently identifies the tiny corneal or conjunctival wound marking the site of entry. If the path of such a foreign body passes through the iris, the small resulting hole may often be seen with a loupe or the unaided eye. If the corneal entrance wound is sizeable, the defect is plugged by iris which often prolapses outside the eye.

#### SLIDE 24

✓ X-ray examination of the orbit is mandatory in all such cases. Penetrating foreign bodies usually cause no pain after the frequently trivial discomfort at the moment of impact. If the lens or central retina is damaged, or if bleeding occurs into the aqueous or vitreous, vision may be impaired. If not, the patient may remain virtually asymptomatic for several days or occasionally for many years. Although most high velocity metallic foreign bodies are sterile, occasionally bacterial or fungal infection may be associated with intraocular foreign bodies, leading to pain and marked loss of vision beginning several days (bacterial) or weeks (fungal) after the injury. Fortunately, bacterial infection is the more common, and can usually be prevented by the use of prophylactic antibiotics, if the diagnosis of intraocular foreign body is made promptly. Penetrating foreign bodies are usually iron or steel and can be removed with an electromagnet. This technique was first developed in Belfast, when a patient from Harland & Wolff's had an intraocular metallic foreign body removed from his eye. Nonmagnetic foreign bodies eg. copper, lead, require intraocular instrumentation for their extraction, and frequently cannot be removed without so much additional trauma that visual function is markedly impaired.

#### 4. Chemical burns

#### SLIDE 25

*Types*  
Chemical burns of the cornea and conjunctiva are common and lead to tissue necrosis. Common causes of chemical burns are the following: lime, lye, ammonia, various acids and detergents. Acid burns are essentially non-

progressive. Penetration of the acid is limited by the buffering action of the tissues and the lesions are sharply demarcated. Alkali burns are particularly severe. The tissues initially damaged by the alkali are often grossly normal in appearance. The alkali, which is less readily buffered, rapidly penetrates the tissues and cannot be easily removed or neutralised. It continues to act for an hour or more.

The emergency treatment of any chemical burn is copious flushing with tap water, followed, as soon as medical assistance is available, by normal saline irrigations and mechanical removal of any solid chemical particles visible. In alkali burns, continuous irrigation should be kept up for at least an hour. An IV set-up is convenient for this purpose. Neutralisation (e.g. citric or boric acid for alkali burns or sodium bicarbonate for acid burns) may be undertaken when accessible, but should never delay emergency irrigations .

#### 5. Conjunctival and scleral lacerations

CONJUNCTIVA

*General*  
Small conjunctival lacerations generally heal without complications and require no treatment. Larger conjunctival lesions may be complicated by extrusion of the underlying Tenon's capsule (a fibrous capsule that surrounds the eye). The lacerations should be repaired with 6-0 catgut sutures. All conjunctival lacerations must be thoroughly explored to exclude the possibility of penetration through the sclera. Prolapse of vitreous or uveal tissue usually facilitates recognition of scleral lacerations, but in their absence careful exploration of the wound by an ophthalmologist is necessary to exclude perforation.

#### SLIDE 26

*Extending through Sclera*

Scleral lacerations require precise suturing. A very soft eye suggests the presence of a scleral laceration or rupture. The cornea is very tough and usually resists penetration except by sharp, high velocity missiles, such as windscreen glass fragments, nails and other metallic foreign bodies. When penetration extends into the anterior chamber, aqueous is lost and the iris frequently prolapses forward and becomes caught in the corneal wound (anterior synechia). This will help to prevent further loss of aqueous. Such injuries require careful suturing of the corneal wound and reposition and/or excision of the incarcerated iris.

#### SLIDE 27

*Traumatic Cataract*

Not infrequently a traumatic cataract is a complication of a penetrating injury. Until ophthalmological care is available both eyes should be covered and the patient kept recumbent. It is important that the eye is protected from direct pressure, e.g. a misapplied pad. A cartella or plastic shield which has its support from the

orbital margins is ideal and should be used routinely. Meticulous protection is particularly important when the patient has serious injuries elsewhere which demand immediate care and divert attention from the ocular injury.

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6. Hypchaema (bleeding into the anterior chamber)

## SLIDE 29

Although hypchaema is caused by a blow which ruptures a blood vessel in the iris or ciliary body, it is more convenient to consider it here alongside trauma to the anterior segment. The usual cause of hypchaema is a severe blow on the eye with a large blunt object. Arrows, darts, fists and pellets are also common causal agents. The blood frequently settles to the lower part of the anterior chamber producing a horizontal fluid level. The source of the bleeding is usually from the root of the iris or ciliary body. Vision is usually impaired by blood present in the aqueous or deposited in a thin film on the anterior lens capsule. Even though the initial haemorrhage is small, secondary bleeding frequently occurs on the second or third day after injury, often producing a more grave situation with the entire anterior chamber filling with blood. Under such circumstances glaucoma (elevation of intra-ocular pressure) is frequently produced and may lead to permanent blindness.

## SLIDE 30

Lysis of the red blood cells in the aqueous and staining of the cornea with haemosiderin may also occur with raised intraocular pressure. This may lead to impaired vision for many years. In order to reduce the chances of secondary bleeding, all patients with hypchaema should be hospitalised and placed on strict bed rest until the condition resolves.

This is not always possible with young children; however, they should be kept under close supervision. Secondary haemorrhage with a prolonged rise in intraocular pressure requires surgical evacuation of the blood from the anterior chamber.

7. Subconjunctival haemorrhage

## SLIDE 31

Although most subconjunctival haemorrhages appear spontaneously in otherwise healthy patients without blood dyscrasias, occasionally they are caused by trauma. The picture is characteristic and much more alarming to the patient than the prognosis of the condition warrants. A large area of the conjunctiva will appear blood red. No treatment is necessary and the blood resolves without any

residual scarring in about two weeks. Blood dyscrasias and basal fractures of the skull and orbit may occasionally result in subconjunctival haemorrhage. An x-ray of the skull is warranted when there is a history of head injury. The blood pressure should be checked in patients with spontaneous subconjunctival haemorrhage.

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### B. INFLAMMATION AND INFECTION INVOLVING THE LIDS

#### SLIDE 33

#### 1. Blepharitis

Squamous or seborrheic blepharitis is similar to dandruff of the scalp. The patient may complain of burning, itching or irritation of the lids, but frequently has no complaints. The lid margins are injected and greasy scales are found at the bases of the lashes. Seborrhea of the lid margins is frequently associated with seborrhea of the scalp, the eyebrows, and the ears. It is thought that the lipid in the secretions is broken down by corynebacteria acnes into irritating free fatty acids.

Although treatment with anti-dandruff shampoos (Selsun) to control seborrhea of the scalp and removal of scales from the lid margins, with a cotton-tipped applicator and a solution of baby shampoo are helpful, this is a chronic condition and is difficult to cure permanently. Blepharitis may complicate rosacea and may be associated with dry eyes.

Ulcerative blepharitis generally results from a staphylococcal infection of the hair follicles of the lid margins, and complicates a squamous blepharitis. The symptoms are irritation, itching and mild photophobia.

#### SLIDE 34

Ulceration of the lid margins is seen when the scales (collarettes) are removed. Treatment requires the addition of topical antibiotics and occasionally systemic antibiotics once the infection becomes entrenched in the hair follicles and subcutaneous tissues. Loss of eyelashes, ingrowing eyelashes (trichiasis) and lid deformities may result. Other complications include marginal keratitis.

#### 2. Chronic meibomianitis

This disorder is associated with seborrheic blepharitis, dermatitis and acne rosacea. There is an abnormality of lipid secretion from the meibomian glands. The lipid secretion normally forms the most external layer of the tear film and defective lipid production leads to excessive evaporation of tears resulting in a stinging



sensation. A decreased tear break-up time can be demonstrated (normally >10 secs). Excessive lipid secretion in the tears can give rise to foam in the lower lid tear meniscus. Treatment includes lid hygiene, warm compresses, artificial tears and sometimes prolonged courses of low dose systemic antibiotics e.g. oral Tetracycline 250 mg b.d. for two months.

### 3. Hordeolum

Hordeolum is an acute staphylococcal infection of the glands of the lid.

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Internal hordeolum is a staphylococcal infection of an obstructed Meibomian gland. The obstruction is frequently secondary to a chronic seborrheic or ulcerative blepharitis. The hordeolum may follow one of four courses:

- 1 it may resolve without any residual deformity.
- 2 an abscess may form and drain spontaneously (or following incision) through either the conjunctiva or the skin.
- 3 the hordeolum may develop into a cellulitis of the soft tissues of the lid.
- 4 a chronic inflammation may result in the formation of a 'chalazion' and is discussed further on.

External hordeolum (or sty) is an acute staphylococcal infection of the follicles of the cilia of the lid and their accessory glands (Zeis and Moll). It occurs at or near the lid margin. The course is similar to that of an internal hordeolum, with spontaneous resolution or drainage through the skin, the most common outcomes.

### 4. Chalazion

Chalazion (or Meibomian cyst) is a chronic granuloma of the meibomian glands. It appears to result from obstruction of one or more glands, at times following a hordeolum. Histologically, foreign-body giant cells are seen phagocytosing the fatty meibomian secretions, accompanied by acute and chronic inflammatory cells. The lesion is termed a lipogranuloma. Clinically the lesion appears as a reddened, circumscribed, usually non-painful nodule, either on the lid margin or deeper within the lid substance overlying the tarsal plate. Unlike the acute abscesses of the lid described previously, the chalazion usually does not resolve spontaneously, but must be incised and curetted to remove the lipid and granulomatous tissue within it.

5. Herpes zoster ophthalmicus is a very serious viral infection which has a predilection for the Gasserian ganglion and the first and second divisions of the fifth (trigeminal) cranial nerve.

#### SLIDE 36

It frequently is seen in older or debilitated individuals and is caused by the varicella-zoster virus. Several days before the onset of the vesicular lesions the patient may experience hyperaesthesia in the area which will be involved. Some photophobia and occasionally pain on movement of the eye may occur. Subsequently vesicles erupt on the skin in the region of the distribution of the first and/or second divisions of the trigeminal nerve. There is always a sharp demarcation along the midline of the nose, eyebrow and forehead. In most patients the tip of the nose receives its sensory innervation from the nasociliary branch of the trigeminal nerve, as does the cornea. Therefore, as a general rule, if vesicles appear on the tip of the nose, ocular involvement may be expected. This is known as Hutchinson's sign. If the eye is involved, localised infiltrates occur within the corneal stroma and a secondary iridocyclitis develops. Occasionally, total, permanent corneal opacification may result. Secondary glaucoma, optic neuritis and extraocular palsies less frequently complicate the zoster infection. Although it is less commonly seen in children, Herpes zoster ophthalmicus may precede the more classical general eruption of chickenpox.

The iridocyclitis may cause permanent visual damage and may be easily overlooked because of gross lid swelling. Treatment includes Acyclovir (oral and topical) mydriatics and topical steroids.

### C. INFECTION OF THE LACRIMAL SAC

#### SLIDE 37

##### 1. Acute dacryocystitis

Acute dacryocystitis is characterised by a red painful swelling near the inner canthus. If tenderness does not preclude palpation of the swollen area, reflux of pus from the lacrimal puncta may be produced. Frequently, however, obstruction of the canaliculi prevents the exit of pus by this route (and presumably plays a part in the maintenance of the infection). At least partial obstruction of the naso-lacrimal duct, (probably due to congenital narrowing of the bony canal and/or redundant folds in the mucosa lining it) is probably a prerequisite for development of a full-blown dacryocystitis. It seems reasonable to assume that an otherwise mild upper respiratory infection might produce sufficient swelling of the mucous membrane to lead to complete obstruction in

such predisposed cases. The offending organisms most commonly found are streptococci, staphylococci and pneumococci. They appear to come from the nose rather than the conjunctival sac.

## 2. Chronic dacryocystitis

Chronic dacryocystitis usually produces a clinical picture little different from a simple obstruction of the naso-lacrimal duct. Epiphora, the overflow of tears due to failure of the normal lacrimal drainage system, is the chief problem. In the case of simple obstruction of the lacrimal drainage system the puncta are frequently tiny or completely invisible, whereas one or both usually appear dilated or at least of normal size in the presence of chronic dacryocystitis. Firm pressure over the sac may produce a drop or two of secretion from the lower (or less commonly the upper) punctum, confirming the diagnosis. A chronic low-grade conjunctivitis is frequently present in such cases. A surgical by-pass of the obstructed nasolacrimal duct, by making an opening from the lacrimal sac directly in to the nose (dacryocystorrhinostomy), is required to relieve the epiphora.

## 3. Chronic dacryocystitis in infants

A special form of chronic dacryocystitis is that seen in infants due to delayed opening of the lower portion of the nasolacrimal duct. Complete patency of the duct is not established in the majority of infants until shortly after birth. The obstruction may be uni- or bilateral. The mother describes the eye as 'watery' and mucoid secretion is usually present, with or without slight redness of the conjunctiva. Pressure over the sac often produces reflux of mucoid material from the punctum and may at times be of some therapeutic value in promoting opening of the nasolacrimal duct. If obstruction persists past 12 months, probing of the nasolacrimal duct should be undertaken. This is a simple procedure and produces a permanent cure in nearly all cases. The patency of the nasolacrimal system can be tested by instilling a drop of fluorescein into the conjunctival sac. Presence of the dye in the nasal secretions proves patency. The lacrimal passages may also be outlined by syringing with a radio-opaque dye (Dacryocystogram).

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## D. INFLAMMATION AND INFECTION INVOLVING THE EXTERNAL EYE

### Introduction

SLIDE 12

Inflammation of any of the structures of the anterior segment leads to injection of the conjunctival and/or

episcleral vessels. Conjunctivitis is associated with diffuse injection of the superficial vessels over the entire globe and extending on to the conjunctival surface of the lids. Acute iritis causes injection of the deeper episcleral vessels overlying the ciliary body. These vessels course radially from the corneo-scleral limbus toward the equator, are particularly prominent adjacent to the limbus, and because of their deeper location, appear more violet in colour. The resulting ring of injection surrounding the cornea is termed ciliary flush or ciliary injection. Acute glaucoma usually causes injection of both bulbar conjunctival and episcleral vessels, but the palpebral conjunctiva is not involved.

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SLIDE 48

Corneal infection may cause either conjunctival or ciliary injection or both because there is usually an associated secondary iritis and conjunctivitis.

# 1. Conjunctivitis

The four common types of conjunctivitis are bacterial, viral, chlamydial and allergic.

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- a) Acute bacterial conjunctivitis is characterised by muco-purulent secretion which adheres to the lashes, matting them together. When the eyelids are closed the conjunctival sac is a closed space forming an ideal culture medium for bacteria. The lids are frequently stuck together on arising in the morning. In mild cases only mucoid or watery secretion may be present. Staphylococci and streptococci are frequent offenders, but in temperate climates the common 'pink eye' is more frequently pneumococcal conjunctivitis. The causative organism can usually be found by culture and/or smear. Both eyes are frequently affected. The disease is readily transmitted by physical contact to other members of the family. Although most cases resolve spontaneously within ten to fourteen days, treatment with topical antibiotic drops is indicated and usually cures the condition within a few days. Chloramphenicol or Gentamicin drops are commonly used.

Preparations containing steroids should be avoided

- b) In chronic bacterial conjunctivitis both injection and secretion may be minimal. When unilateral, this condition is usually secondary to obstruction of nasolacrimal duct and chronic dacryocystitis. Treatment is ineffective unless the obstruction to drainage of tears from the lacrimal sac into the nose is relieved.

- c) Bilateral chronic conjunctivitis is frequently accompanied by maceration of the skin at the outer canthi, and is then termed angular conjunctivitis. Prolonged treatment may be necessary, with topical antibiotics or 1/4 per cent zinc sulphate which is effective against Moraxella lacunata a common cause of angular conjunctivitis.

## SLIDE 40

- d) Acute viral conjunctivitis is common and often associated with an adenovirus infection in children or young adults. There is a wide spectrum of disease from mild conjunctivitis to full-blown pharyngoconjunctival fever and epidemic keratoconjunctivitis. Typically, lymph follicles are prominent in the lower conjunctival fornix. The conjunctival discharge is watery and there may be associated preauricular lymphadenopathy. Treatment is ineffective and generally designed to prevent secondary bacterial infection. The disease, however, is self-limiting and runs a course of some five to six weeks.

- e) Adult inclusion conjunctivitis. This is caused by serotypes D-K of Chlamydia trachomatis and typically affects young adults. This infection is venereal in nature and may be associated with a non-specific urethritis or cervicitis. Treatment consists of oral and topical tetracycline for six weeks.

Trachoma. This infection is the commonest cause of world blindness and affects approximately 15% of the world's population. The infection was brought to the attention of western medicine when large numbers of British troops were infected during the Napoleonic campaign in Egypt in 1798-99. Hence, the term Egyptian or military ophthalmia.

Returning soldiers, many of them blind, transmitted the infection to the civilian population, creating a public health problem of major proportions and leading to the establishment in 1805 of London's Moorfields Eye Hospital, soon to become and remain one of the world's leading ophthalmological centres.

Trachoma is caused by serotypes A B Ba and C of Chlamydia trachomatis (of the psittacosis-lymphogranuloma-trachoma (PLT) group). Trachoma involves both cornea and conjunctiva, beginning typically with a conjunctivitis indistinguishable initially from that due to bacterial infection. Instead of resolving spontaneously within a few days or weeks, however, conjunctival inflammation persists and progresses through a variety of stages, beginning with hyperplasia of lymph follicles in the

Chlamydia  
Serotypes D-K  
Venereal

Egyptian/military ophthalmia  
Trachoma  
Chlamydia serotypes A-C  
Congenital trachoma  
Purulent (leucorrhoea)  
Tarsis

conjunctiva and progressing to severe scarring of the conjunctiva underlying the tarsal plate.

## SLIDE 42

stages  
conjunctivitis  
hyperaemia upper eyelid  
conjunctival scarring  
pannus

The superior cornea becomes infiltrated with chronic inflammatory cells and becomes vascularised (Pannus). The condition eventually reaches a quiescent stage but often not before the deformed and inturned upper eyelid severely traumatises and scars the cornea, with consequential impairment of vision. Severe drying (xerosis) of the eye may follow widespread reduction of the conjunctival glands.

## SLIDE 43A

quiescent  
xerosis

Spread of the disease is by direct contact and is enhanced by poverty and lack of personal and community hygiene. Secondary bacterial infection is common.

Treatment - the sulphonamides, and more recently the tetracyclines and erythromycin, are highly effective in the treatment of active trachoma, but have by no means eradicated the disease.

- g) Allergic conjunctivitis is characterised by itching, papule and follicle formation on the palpebral conjunctiva and often a seasonal incidence. It may be induced by topical ophthalmic drugs (especially Neomycin and Atropine). Secretion is minimal and stained smears show eosinophils. Treatment should aim to eliminate the allergen, if possible. Treatment involves topical sodium cromoglycate (G. Opticrom) or antihistamine (G. Otrivine-Antistin).

## SLIDE 43B

## SLIDE 44

- h) Ophthalmia neonatorum, conjunctivitis in the newborn infant, contracted during or shortly after birth, was once among the most common causes of blindness in children. The most important causative agent in the past was the Gonococcus which produced a fulminating purulent conjunctivitis which usually began within the first seventy-two hours after birth. The infection spread rapidly to involve the cornea, frequently leading to ulceration and subsequent corneal opacification and at times to perforation of the cornea, extrusion of the lens and vitreous, and complete disorganisation of the globe. In 1881, Carl Siegmund Franz Crede popularised prophylactic treatment consisting of installation of silver nitrate drops into the eyes. Widespread adoption of these measures led to a decrease in the incidence of ophthalmia neonatorum from more than 10% of births to under 0.5%. Silver nitrate must be

used with care, as too strong a solution is injurious. In Northern Ireland it is no longer required that silver nitrate solution be instilled into the eyes of the newborn. The eyes are usually cleaned with a saline soaked swab. The current incidence of ophthalmia neonatorum is 0.1%.

Today, staphylococci and Chlamydia trachomatis (serotypes D-K) are the most common causes of conjunctivitis in the newborn. These agents produce a conjunctivitis which makes its clinical appearance during the second week of life or later and varies in severity from mild infection accompanied by mucoid secretion to severe redness and swelling of conjunctiva and lids with purulent secretion. The natural defences of the thin, delicate corneal and conjunctival epithelium are minimal because there is no tear production and little lymphoid tissue in the conjunctiva in the neonate.

A conjunctivitis in the newborn requires careful treatment. Smears should be made and stained with Gram and Giemsa stains for identification of bacteria or inclusion bodies, and cultures plated. Topical instillations of antibiotics are used. Penicillin (10,000 units per ml) is useful if gonococci, staphylococci or gram positive bacteria are present. Broad spectrum antibiotics such as tetracycline or erythromycin are effective if inclusion bodies or gram negative bacteria other than gonococci are present in the initial smears.

## 2. Corneal infections (keratitis)

### a) Bacterial keratitis

#### SLIDE 45

The intact corneal epithelium is resistant to infection but once its continuity has been broken, the stroma is highly vulnerable to many different organisms. Trauma thus plays an important role in the genesis of corneal infection, as do abnormalities of the lids or lacrimal apparatus which impair their protective function. Once infection gains access to the stroma, this tissue is rapidly destroyed in the involved area, leading to a corneal ulcer. Leucocytes attracted to the inflamed tissue frequently accumulate in the aqueous humour, sink to the bottom of the anterior chamber and form a white band with a straight horizontal upper edge termed a 'hypopyon'. Vascularisation proceeds from the limbus to the infected area, and the infectious process slowly resolves following the arrival of the vessels. An opaque scar usually remains with marked distortion and reduction of vision.

## SLIDE 9

Vigorous topical antibiotic therapy every 30 to 60 minutes is usually effective in eradicating the infection and if initiated soon enough may prevent scarring.

Common causative organisms include pneumococci, staphylococci, streptococci and Pseudomonas aeruginosa. The latter organism is particularly virulent once it has gained access to the corneal stroma and within 24 to 36 hours the cornea can melt away, followed by perforation and loss of the eye. Pseudomonas is a contaminant of contact lens solutions and grows well in Emergency Room solutions of fluorescein eye drops. Such solutions should be avoided and individually wrapped sterile drops or strips of filter paper impregnated with fluorescein used instead.

b) Viral keratitis

The most common and important cause of viral keratitis is herpes simplex. It is unusual for the cornea to be involved in the primary infection, but it is a common site for recurrent attacks.

The initial corneal lesion is usually confined to the epithelium, which shows a shallow ulceration, frequently in a typical 'dendritic pattern'.

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Since there is no opacification of the cornea this early lesion is easily overlooked but is strikingly demonstrated by fluorescein, a yellow-green dye which stains areas of corneal stroma unprotected by epithelium. The patient typically presents with a mild foreign body sensation and slight blurring of vision. The conjunctival and episcleral vessels are mildly injected and there may be slight watery or mucoid secretion. The absence of the severe pain usually associated with corneal epithelial damage is due to the marked impairment of corneal sensitivity characteristic of herpetic keratitis. Fortunately, many attacks of epithelial herpes tend to resolve spontaneously within a week or two. The epithelium heals without scarring and vision returns to normal. Treatment is with topical Acyclovir ointment 5 times daily.

In all too many cases the corneal stroma becomes involved, either with ulceration or opacification of a disc-shaped area beneath the epithelial ulcer.

## SLIDE 47



The prognosis is here much worse, with the chronic corneal inflammation smouldering on for months and producing iritis and often secondary glaucoma. Healing may eventually occur, but scarring is severe, leading to loss of useful vision in the involved eye. Treatment involves Acyclovir ointment and cautious use of topical steroids.

Adrenaline has a potentiating effect on the herpes virus and can cause recurrence of the keratitis. This drug is often used in the treatment of chronic glaucoma and should be used with care in herpes simplex infections of the eye.

c) Fungal keratitis

Fungal infection of the cornea is usually secondary to injury by vegetable matter. The course is indolent and treatment difficult. Fungal growth may be encouraged with the use of topical steroids. Systemic antibiotics, corticosteroids and immunosuppressive drugs have contributed to the marked increase in keratomycosis due to Aspergillus, Candida, Fusarium and Cephalosporium.

3. Inflammation of the sclera

- a) Episcleritis is a localised acute inflammation of episcleral tissue which typically affects young adults and may be recurrent. The eye may ache and be slightly tender to palpation. Visual acuity is normal.

SLIDE 48

- b) Scleritis is a granulomatous lesion which causes severe pain, scleral thinning, and rarely perforation. The eye is tender on palpation. Scleritis is associated with connective tissue disease, especially rheumatoid arthritis.

Local steroids are effective in both episcleritis and scleritis, although occasionally a severe scleritis may run an unremitting course to perforation regardless of any therapy.

E. NEOPLASIA

1. Congenital tumours of the lid

SLIDE 49

- a) Dermoid cysts usually occur between the brow and the upper lid near the inner or outer canthus. They are usually attached to the periosteum of the bone in this area and may have extensions into the orbit. These tend to be cystic lesions lined by several

layers of flat epithelium with keratinisation. The cysts contain dermal appendages, fat and cholesterol.

b) Haemangiomas of the lids and orbit may be divided into three major types:

i) Haemangiomas of the newborn (strawberry marks) occur in 1-3% of full term infants and in a somewhat higher percentage of premature infants. They may occur in any area of the skin. They are frequently not noted until several weeks of age. They appear as soft, elevated bright red tumours. These tumours are composed of endothelial cells, in solid cords ('angio-blastic haemangioma') or capillary channels ('capillary haemangioma'), or a combination of both. Cavernous (see below) areas may also occur in these tumours. Spontaneous regression nearly always occurs, beginning usually by the age of one year and reaching completion by the age of five. Active treatment is therefore unnecessary, unless vision is obstructed. Since normal visual acuity will not develop in any eye which is occluded during the first years of life, it is imperative to make every effort to remove any obstruction to vision as soon as possible. Sclerosing agents, low doses or irradiation, freezing and systemic corticosteroids have all been used with success in these cases. Laser treatment may also become useful. It may even be necessary to hitch up the upper eyelid with temporary sutures to prevent amblyopia.

start 1 yr  
gone 5 yrs  
strawberry

ii) Cavernous haemangiomas are large soft tumours composed of thin-walled blood-filled cavities lined by a single layer of endothelium. They are less common than haemangiomas of the newborn. Although presumably present at birth, they are usually not apparent until later in childhood, or in early adult life, since the skin itself is usually not involved. When present in the lids, these tumours appear as smooth subcutaneous masses with a bluish tint. They frequently become much more prominent when venous pressure is raised by lowering the head or by crying. The tendency for spontaneous regression is less than in haemangiomas of the newborn.

bluish tinge  
could be present  
+ disappear

iii) Port-wine stain is the descriptive term applied to telangiectatic haemangiomas of the skin. A telangiectatic haemangioma is made up of thin-walled vessels interspersed between the otherwise relatively normal cells of the involved tissue (as opposed to angioblastic, capillary and cavernous haemangiomas, in which

bluish red  
burn in  
don't disappear  
skin hypopigmented  
trigeminal  
dermatome

the tumour displaces the adjacent normal tissue to a greater extent). The affected skin usually appears normal except for its dark reddish-blue colour, but may be hypertrophic in extensive lesions. The defect is present at birth, and remains the same throughout life. Facial involvement is common, usually unilateral in the distribution of one or more branches of the trigeminal nerve, and may be associated with haemangioma of the choroid, congenital glaucoma and haemangioma of the meninges on the ipsilateral side (Sturge-Weber Syndrome).

SLIDE 50

## 2. Acquired Tumours

SLIDE 51

- a) Basal cell carcinoma is the commonest malignant tumour of the lids, occurring most often on the lower lid. The lesions appear as small nodular tumours with dilated surface vessels. As the nodule grows, its apex frequently ulcerates. Pigmentation frequently occurs and the edge of the ulcer assumes a pearly appearance. The tumour arises from the basal cell layer of the epithelium and is locally invasive. Early excision biopsy of any indolent eyelid ulcer is essential so that reconstructive surgery is not complicated by extensive loss of eyelid tissue.

SLIDE 52

- b) Squamous cell carcinoma may resemble basal cell carcinoma and can be confused with senile keratosis and keratoacanthoma (see below). The tumour arises from the epidermoid layers of the skin, is locally invasive and may metastasize through regional lymph nodes (preauricular and submandibular).
- c) Keratoacanthoma is a benign lesion which is often mistaken for low grade squamous cell carcinoma of the lid. The lesion grows rapidly for six to eight weeks, reaches a maximum size and then spontaneously regresses with only a slight amount of scar formation resulting. The lesion is alarming to the patient because of the rapid increase in size but this very feature is most helpful in arriving at the correct diagnosis.

SLIDE 53

- d) Xanthelasma is a deposition of fat in the eyelid skin appearing as a yellow plaque in the superficial layers of the skin. Xanthelasmata may be seen in patients with hypercholesterolaemia, histiocytosis X

lower lid  
Pearly  
ulcerate

Causes  
hypercholesterolaemia  
histiocytosis X  
DM  
benign

or diabetes mellitus, but usually occur in individuals who have no systemic disorder.

#### SLIDE 54

- e) Papilloma is a benign lesion of viral origin, ubiquitous, and easily removed by excision or cautery. Care must be exercised when removing papillomata encroaching on the lid margin.

### 3. Tumours of the cornea and conjunctiva

#### SLIDE 55

#### Squamous cell carcinomas of the conjunctiva and cornea

These tumours are uncommon. They occur at the limbus, and may extend to involve much of the orbit. Exenteration (total removal of contents of orbit) is often necessary to ablate the entire tumour. Metastases to the lymph chain of the neck may occur in neglected cases.

Other conjunctival swellings:

- Pinguecula is a common tumour-like lesion of the conjunctiva. It appears as a yellow nodule in the interpalpebral fissure. It is degenerative in nature and not neoplastic. No treatment is needed.

#### SLIDE 56

- Pterygium is a growth of abnormal conjunctival tissue, which may extend on to the cornea. It is thought frequently to be the result of chronic irritation and exposure. It is common in farmers and those involved in dusty, out-of-doors occupations, particularly in hot, dry climates. It may gradually extend over the centre of the cornea and impair vision. Surgical excision is necessary before this occurs.

### F. MISCELLANEOUS EXTERNAL DISEASES

#### SLIDE 43.A

#### 1. Entropion

Entropion is an inward turning of the lid margin, usually the lower lid. It may be caused by involutional (senile) changes in the lower lid (senile entropion), spasm of the orbicularis muscle (spastic entropion) or by scarring and contraction of the conjunctiva (cicatricial entropion). It occurs rarely as a congenital defect. In each case, the result is mechanical irritation of the cornea (and conjunctiva) by the lashes. Permanent correction requires plastic surgery.

Senile  
Spastic  
Cicatricial  
Congenital

Cicatricial entropion presents a more difficult surgical problem.

## 2. Ectropion

SLIDE 57

*Cicatricial*  
*senile*  
*paralytic*  
*congenital*  
This is an eversion of the lid margin. It may be due to contraction of a scar in the skin of the lid or cheek (cicatricial ectropion), but the most common cause is a degenerative elongation of the lid in older individuals (senile ectropion). A paralytic ectropion following seventh nerve palsy may also occur. Congenital ectropion is rare. The major problem caused by ectropion is the loss of contact between the inferior punctum and the lake of tears which normally accumulates adjacent to it and flows into it. The result is epiphora (excessive watering). Frequent sequelae include exposure keratitis of the lower third of the cornea and keratinisation of the conjunctiva of the lower lid. Surgical repair is required.

## 3. Ptosis

SLIDE 58

Ptosis, or drooping of the upper lid, will be considered later.

## 4. Lid retraction

*trauma*  
*oculomotor*  
Lid retraction may result from mechanical elevation of the eyelids following injury, or from overaction of the sympathetic or third cranial nerve supply to the eye. The commonest cause is endocrine (thyrotoxicosis). Thyroxine potentiates the activity of the sympathetic system, which stimulates Muller's muscle (deep part of levator palpebrae superioris) thus elevating the eyelid.

## Corneal dystrophies

*Corneal Dystrophies*  
*unknown aet*  
*gradual degener*  
*opac of corne*  
*non-inflammatory*  
*bilateral*  
*familial*  
These are a heterogeneous group of conditions of varying and mostly unknown aetiology that result in gradual degeneration and opacification of the cornea. They are non-inflammatory, bilateral, and in many cases familial. When corneal opacification is sufficient to interfere significantly with vision, most cases can be successfully treated by corneal transplantation.

SLIDE 60, 61

Commoner corneal dystrophies are:

SLIDE 62, 63

- a) Arcus senilis is an infiltration of the peripheral cornea and sclera with lipid, and is so common as to be considered a normal change of ageing.

- b) Keratoconus, one of the more common dystrophies, is characterised by a gradual thinning of the central cornea so that it protrudes forward making the cornea cone-shaped. This results in a high degree of astigmatism. When mild, contact lenses are sufficient to restore normal vision, but later corneal transplantation may be needed.
- c) Fuch's dystrophy of the cornea is caused by a deterioration of the corneal endothelium so that it is no longer able to maintain corneal deturgescence. Oedema of the cornea and corneal clouding ensue. Corneal transplantation is successful in a high percentage of patients.

#### 6. Toxic and metabolic disorders of the cornea.

- a) Chloroquine keratopathy is a reversible opacification of the superficial cornea resulting from chronic ingestion of this drug.
- b) Band keratopathy is a characteristic opacification in Bowman's membrane and the superficial stroma following deposition of calcium. It occurs only in the interpalpebral tissue presumably because evaporation of the tears precipitates deposition of the calcium. The opacity begins near the limbus but is separated from it by a narrow clear zone. Band-shaped keratopathy may occur in any eye severely damaged by trauma or uveitis. It is particularly common in children with chronic uveitis associated with rheumatoid arthritis. It also occurs in patients with hypercalcaemia, which may be due to hyperparathyroidism, vitamin D poisoning, sarcoidosis, or severe renal damage (metastatic calcification).

SLIDE 65

- c) Kayser-Fleischer ring is a deposition of brown copper pigment in the periphery of Descemet's membrane and is pathognomonic of Wilson's disease (hepatolenticular degeneration).

#### 7. Staphyloma - ectasia of the sclera, lined by uvea (and if posterior, also retina). due to weakness of sclera

- a) Posterior staphylomas occur adjacent to the optic nerve, in highly myopic eyes, where scleral thinning is common.

SLIDE 3

- b) Anterior staphylomas occur between the limbus and equator. They are usually secondary to preceding scleral inflammation or injury.