Red and dry eyes

By Carolyn Allen

This education module is independently researched and compiled by PSA-commissioned authors and peer reviewed.

Customers often ask pharmacists and pharmacy staff for advice about treating red or dry eyes. Redness and dryness are symptoms of several minor eye conditions that can be easily treated with non-prescription eye products. However, red or dry eyes can also be signs of a serious eye condition that needs to be referred to a doctor.

Learning objectives
After reading this article, the pharmacist should be able to:

• describe the symptoms of conjunctivitis caused by allergy, irritation and infection
• describe eye signs and symptoms that need referral to a doctor or optometrist
• discuss the treatment of conjunctivitis due to allergy, irritation and infection
• discuss the causes, symptoms and treatment of dry eyes
• counsel customers on the correct use of chloramphenicol eye drops and ointment.

Competencies addressed (2010): 1.1.1, 1.1.2, 1.2.1, 1.3.2, 2.2.1, 2.3.2, 6.1.1, 6.1.2, 6.1.3, 6.2.1, 6.2.2, 6.2.3, 6.3.3, 7.1.2.

The most common cause of red eye is conjunctivitis.

Red eyes

A red eye is caused by dilation of blood vessels in the eye. It is a classic sign of eye inflammation. Inflammation of almost any part of the eye can cause a red eye. The most common cause of red eye is conjunctivitis. Other common causes include dry eyes, blepharitis, sub conjunctival haemorrhage, episcleritis, scleritis, corneal abrasion, foreign body, keratitis, iritis, glaucoma and chemical burn.1

A person with a red eye, but mild or no pain, is likely to have a self-limiting condition such as conjunctivitis, sub conjunctival haemorrhage or episcleritis. A person with a red eye and moderate to severe pain is likely to have a sight-threatening condition, and should be referred. Anyone with an acute change in their vision or photophobia also needs to be referred.2,4 See practice point 1.

Conjunctivitis

Conjunctivitis means inflammation of the conjunctiva. It is often called red eye or pink eye. The conjunctiva is a thin, transparent layer of tissue that lines the inside of the eyelids and covers the white part of the eyeball (the sclera). It helps to protect the eye and secretes the mucous component of the tear film.

Reproduced with permission from Antibiotic Expert Group. Diagrammatic representation of the eye structures involved in infectious diseases (Figure 2.2) [revised 2010 June]. In: eTG complete. Melbourne: Therapeutic Guidelines Limited; 2012 Nov.

Inflammation of the conjunctiva causes dilation of conjunctival blood vessels, ocular discharge and in some cases conjunctival oedema (chemosis). Conjunctivitis can be caused by allergy, irritation, or infection (e.g. viral, bacterial). It may result from primary involvement of the...
conjunctival tissue, or may occur secondary to other conditions such as dry eyes and blepharitis.1,6,7

Common symptoms of conjunctivitis are shown in Table 1.

**Allergic conjunctivitis**

Allergic conjunctivitis is caused by a local response to an allergen. The most common forms are seasonal and perennial allergic conjunctivitis, and contact hypersensitivity reactions. Seasonal conjunctivitis is mainly caused by seasonal pollens. It is the most common form of allergic conjunctivitis. Perennial conjunctivitis is caused by allergens that are present in the environment all year round (e.g. house dust mite, animal dander, mould spores).

Contact hypersensitivity reactions are commonly caused by eye drops (often the preservative), contact lens solutions, cosmetics, other chemicals (e.g. chlorine) and plants.4,6,9,11,13,14

Table 1: Signs and symptoms of some common causes of red eye1,6,9,10,11,12

<table>
<thead>
<tr>
<th>Conjunctivitis</th>
<th>Acute bacterial</th>
<th>Viral</th>
<th>Allergic</th>
<th>Iritant</th>
<th>Dry eyes</th>
<th>Sub conjunctival haemorrhage</th>
<th>Blepharitis</th>
<th>Episcleritis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eyes affected</td>
<td>Usually starts in one eye and spreads to both</td>
<td>Usually starts in one eye and spreads to both</td>
<td>Usually both</td>
<td>One or both</td>
<td>Both</td>
<td>One</td>
<td>One or both</td>
<td>One or both</td>
</tr>
<tr>
<td>Redness</td>
<td>Diffuse</td>
<td>Diffuse</td>
<td>Diffuse</td>
<td>Localised or diffuse</td>
<td>Diffuse</td>
<td>Localised bright red patch on white sclera</td>
<td>Eye lid margins, may also cause red eyes</td>
<td>Usually localised</td>
</tr>
<tr>
<td>Itching</td>
<td>No</td>
<td>No or mild</td>
<td>Intense</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Discomfort</td>
<td>Gritty, stinging, burning</td>
<td>Gritty, burning</td>
<td>Gritty, burning</td>
<td>Burning, a foreign body will be felt</td>
<td>Dry, gritty, stinging, burning, tired</td>
<td>Mild to none</td>
<td>Gritty, burning, dryness</td>
<td>Mild to no pain</td>
</tr>
<tr>
<td>Discharge</td>
<td>Mucopurulent: eye lids ‘glued’ shut after sleep</td>
<td>Watery</td>
<td>Watery</td>
<td>Watery</td>
<td>Intermittent watery</td>
<td>No</td>
<td>Excessive tearing</td>
<td>May cause mild watering</td>
</tr>
<tr>
<td>Eyelid swelling</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Conjunctival oedema</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Oedema of episclera</td>
</tr>
<tr>
<td>Photophobia</td>
<td>No</td>
<td>Uncommon</td>
<td>No or mild</td>
<td>No or mild</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Vision</td>
<td>Normal, discharge may cause blurring</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal, may be blurred</td>
<td>Normal, may be blurred</td>
<td>Normal</td>
<td>Normal, may be blurred</td>
<td>Normal</td>
</tr>
<tr>
<td>Associated signs/symptoms</td>
<td>Cough/cold symptoms</td>
<td>Enlarged preauricular lymph nodes are characteristic</td>
<td>Other allergy symptoms</td>
<td>Reduced tolerance to contact lens wear</td>
<td>Common with use of antiplatelet and anticoagulant agents</td>
<td>Crusted, scaling eyelids</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Treating allergic conjunctivitis**

Mild symptoms of allergic conjunctivitis may be relieved by rinsing the eyes with normal saline (sodium chloride 0.9% solution) twice daily, using lubricant eye drops 4–8 times daily and applying cold compresses. Moderate and severe symptoms can be relieved with antihistamine or non-steroidal anti-inflammatory eye drops. Severe allergic conjunctivitis may require corticosteroid eye drops.4,16,17

Eye drops containing cromoglycate or loxodaxime can be used to prevent recurrent symptoms. Cromoglycate and loxodaxime are mast cell stabilisers that prevent release of inflammatory mediators from mast cells. They have a delayed onset of action and may take up to six weeks to reach full effect.16

Eye drops available in Australia for allergic conjunctivitis are shown in Table 2. Note that long-term use of eye drops containing a vasoconstrictor is not recommended. See practice point 5.16

Oral antihistamines can relieve and prevent all types of allergy symptoms, including allergic conjunctivitis.

Corticosteroid nasal sprays used for allergic rhinitis.16

Oral antihistamines can relieve and prevent allergy symptoms, including allergic conjunctivitis. Recommendations for allergic conjunctivitis.

**Irritant conjunctivitis**

Irritant conjunctivitis can have a mechanical or chemical cause. Common mechanical causes include entropion (inward turning of the eyelid), dust or a foreign body. Common chemical causes include shampoo, smoke or swimming pool chlorine. Symptoms usually resolve when the cause is removed.7 The eyes can be rinsed with lukewarm clean water or normal saline to remove the irritant, or first aid procedures may need to be followed. See practice point 2. Lubricant eye drops can help to rinse the irritant from the eye and relieve discomfort. Vasoconstrictor eye drops may help reduce redness and discomfort.18 See practice point 5.

**Contact lens-related conjunctivitis**

Contact lens wear can cause conjunctivitis by a number of different mechanisms including giant papillary conjunctivitis (GPC), contact lens-related trauma, allergies to contact lens cleaning solutions, hypoxic conditions and bacterial infection. People with contact lens-related conjunctivitis should stop wearing contact lenses until the cause for the conjunctivitis has been identified and corrected. These people need to be referred to an optometrist or a doctor.19 See practice points 1 and 2.

GPC is an allergic-type reaction in response to the prolonged presence of a foreign body in the eye. It occurs mainly in people who wear hard or rigid contact lenses, wear soft contact lenses that are not replaced frequently, have an exposed suture on the surface of the eye, or have a glass eye. Symptoms include papillae (cobblestone...
Practice point 1

Triggers for referral\(^{2,9,10,12}\)

Signs and symptoms that can indicate a serious cause of red or dry eyes are triggers for referral to a doctor or optometrist. Triggers for referral include:

- severe eye pain or swelling (other than burning or itching)
- redness localised around the iris and the pupil
- photophobia
- vision changes
- restricted eye movement
- cloudy cornea
- pupil looks abnormal or reacts abnormally to light
- copious yellow-green discharge that accumulates after being wiped away
- dry mouth as well as dry eyes
- concomitant headache, nausea or vomiting or feeling unwell
- contact lens wearer
- eye injury, or suspicion of a foreign body in the eye
- a history of welding without eye protection immediately before onset of symptoms
- a history of eye surgery or laser treatment in the past six months
- a history of bone marrow problems
- patient has recently travelled overseas
- symptoms have not been relieved by or have returned after treatment
- patient is using other eye drops, gels or ointments.

Table 2: Some eye drops available in Australia for allergic conjunctivitis\(^{9,16,18}\)

<table>
<thead>
<tr>
<th>Mode of action</th>
<th>Generic name</th>
<th>Brand name</th>
<th>Usual dose schedule</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antihistamine</td>
<td>Levocabastine</td>
<td>Livostin</td>
<td>One drop 2–4 times a day.</td>
<td>S2</td>
</tr>
<tr>
<td></td>
<td>Azelastine</td>
<td>Eyezep</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antihistamine/vasoconstrictor</td>
<td>Antazoline/naphaoline</td>
<td>Antistine-Privine, Albcalon-A</td>
<td>One drop 3–4 times a day, for no more than 5 days in a row.</td>
<td>S2</td>
</tr>
<tr>
<td>Pheniramine/naphaoline</td>
<td>Naphcon-A, Viscine Allergy with Antihistamine</td>
<td>One or two drops 3–4 times a day, for no more than 5 days in a row.</td>
<td>S2</td>
<td></td>
</tr>
<tr>
<td>Mast cell stabiliser</td>
<td>Lodoxamide</td>
<td>Lomide</td>
<td>One drop 4 times a day. Delayed onset of action. Can take 3–6 weeks to reach full effect.</td>
<td>S2</td>
</tr>
<tr>
<td>Sodium cromoglycate</td>
<td>Cromolux, Opticrom</td>
<td></td>
<td>One or two drops 4–6 times a day. Delayed onset of action.</td>
<td>S2</td>
</tr>
<tr>
<td>Antihistamine/mast cell stabiliser/ eosinophil inhibitor</td>
<td>Ketotifen</td>
<td>Zaditen</td>
<td>One drop twice a day.</td>
<td>S2</td>
</tr>
<tr>
<td>Olopatadine</td>
<td>Patanol</td>
<td></td>
<td>One drop twice a day.</td>
<td>S4</td>
</tr>
<tr>
<td>Non-steroidal anti-inflammatory drug (NSAID)</td>
<td>Klorolac</td>
<td>Acular</td>
<td>One drop 4 times a day. For short term use (2–4 weeks) only.</td>
<td>S4</td>
</tr>
</tbody>
</table>

Viral conjunctivitis

Viral conjunctivitis is often associated with viral upper respiratory tract infection (URTI). It is usually caused by an adenovirus, but can also be caused by other viruses, including enterovirus, coxsackievirus, herpes viruses (e.g. Varicella Zoster, Epstein-Barr, Herpes Simplex) and influenza. Viral conjunctivitis caused by the adenovirus is very contagious; conjunctivitis caused by other viruses is less likely to spread. Symptoms are usually mild and last for one to two weeks. Enlargement of the pre-auricular nodes is a characteristic sign of viral conjunctivitis. Symptoms of viral conjunctivitis are shown in Table 1.\(^{1,4}\)

Treatment of viral conjunctivitis

Viral conjunctivitis does not usually need antiviral treatment. Treatment is usually symptomatic and includes eye lubricants (artificial tears) and vasoconstrictor eye drops. If symptoms do not resolve after seven to 10 days, if there is corneal involvement or if herpes infection is suspected the person should be referred to an optometrist or doctor.\(^{1,4,16}\)

Viral conjunctivitis is infectious until redness and weeping stops. People should avoid touching their eyes, wash their hands before and after instilling eye drops and avoid sharing personal items. Food handlers and health care workers should not work until their eye discharge stops.\(^{1,16}\)

Bacterial conjunctivitis

Bacterial conjunctivitis may be primary, or secondary to a viral infection or blepharitis. In children, bacterial conjunctivitis is more common than viral conjunctivitis, while in adults bacterial conjunctivitis is less common than viral conjunctivitis.\(^{21}\)

The most common bacterial causes of conjunctivitis are Haemophilus influenzae (especially in children under 6 years), Streptococcus pneumoniae, Streptococcus pyogenes and Staphylococcus aureus. Other pathogens include Moraxella species, Pseudomonas species, Neisseria gonorrhoeae (gonococcal conjunctivitis) and Chlamydia trachomatis (Chlamydia trachomatis conjunctivitis). Contact lens wearers are more likely to develop infections caused by gram negative bacteria such as Pseudomonas species.\(^{1,4,21}\)

Symptoms of bacterial conjunctivitis are shown in Table 1.
Acute bacterial conjunctivitis is highly infectious and is most commonly spread through direct contact with contaminated fingers or personal items (e.g. towels, facecloths). The spread of bacterial conjunctivitis can be prevented with strict hygiene and by staying home from work, school and childcare. See photo on page 13 of Counter Connection.

**Treatment of acute bacterial conjunctivitis**

Acute bacterial conjunctivitis is the most common form of bacterial conjunctivitis. If not treated it may last up to 14 days, but often resolves within 5 days. A 2006 Cochrane review based on five randomised controlled trials concluded that 65% of patients with bacterial conjunctivitis improve after two to five days without antibiotic treatment, and that severe complications are rare.23

As the use of antibiotics is associated with increased antibiotic resistance, delaying antibiotic treatment could be considered for many cases of acute bacterial conjunctivitis. Antibiotic eye drops are often used to hasten recovery, prevent complications and limit the spread of infection to other people. Antibiotic eye drops can reduce the time away from work, school or childcare.16 Some management options for acute bacterial conjunctivitis are show in Table 3. Pharmacists are able to recommend and supply several treatments for acute bacterial conjunctivitis.

**For mild cases,** Australian guidelines suggest treatment with antiseptic eye drops. Pharmacists can recommend:

- regular eye irrigation using sterile normal saline. Mild cases may resolve with saline irrigation11 or
- propamidine 0.1% eye drops (e.g. Brolene): 1–2 drops, three to four times daily for 5–7 days.4,18

**For severe cases,** Australian guidelines suggest treatment with antibiotic eye drops or ointment. Pharmacists can recommend:

- chloramphenicol 0.5% eye drops (Chlorsol, Chloromycetin): 1–2 drops every two hours for the first 24 hours, decreasing to every six hours as the infection improves. Chloramphenicol 1% eye ointment may be used at bedtime or
- chloramphenicol 1% eye ointment: applied every three hours.

Debris, pus and mucus should be wiped away with normal saline (0.9% sodium chloride solution) before instilling eye drops or ointment. Treatment with chloramphenicol should continue for at least two days after the eye appears normal.4,12,16

Chloramphenicol eye drops are scheduled as Pharmacist-Only medicines. Chloramphenicol has a broad spectrum of activity (although not active against *Pseudomonas* species), has good ocular penetration and is generally well tolerated. The Pharmaceutical Society of Australia (PSA) Guidance for provision of a Pharmacist-Only medicine – chloramphenicol for ophthalmic use can be found in the Australian Pharmaceutical Formulary 22nd edition (APF22) and on the PSA website. If symptoms worsen at any time or have not improved after 48 hours of treatment, the patient should be referred to a doctor or optometrist. If the person wears contact lenses they should be referred. They have a greater risk of eye infection by *Pseudomonas aeruginosa*, which is not susceptible to chloramphenicol.12,16,18 Chloramphenicol eye drops and ointment can be used in children of any age. However, an infant’s eyes are developing, and without ocular examination it is difficult to exclude serious causes of a red eye that might lead to permanent vision impairment. Referral to an optometrist or doctor would be appropriate for children under two years.17 See practice point 3.

**Non-pharmacological management**

A cool or warm compress can relieve the discomfort of conjunctivitis. To make a compress soak a clean, lint-free cloth in cool or warm water, wring it out and gently apply it to closed eyelids. Usually a cool compress will feel the most soothing.

- Do not wear contact lenses until all signs of an eye infection have completely resolved and until 24 hours after completion of topical treatment.

- Avoid rubbing the eyes as this will cause further irritation.

- Never pad a discharging eye.

**Sub conjunctival haemorrhage**

Subconjunctival haemorrhage is usually due to trauma, straining, sneezing or coughing. It is harmless, and the blood is reabsorbed over a few weeks. Warm compresses and eye lubricants may relieve symptoms. A person with a subconjunctival haemorrhage should be referred to a doctor or optometrist if it is associated with pain or penetrating injury, if the haemorrhages are recurrent or if the person is on anticoagulant medication.11

**Practice point 2**

**First aid for eyes**

**Burns** (e.g. heat, chemicals, welding, ultraviolet light)

If burn is due to chemicals or heat, open eyelid gently and wash eye with cold flowing water for 20 minutes. For all burns, place eye pad or light clean dressing over the injured eye only. Phone triple zero (000) for an ambulance.

**Wounds** (e.g. a direct blow)

Lie patient on their back. Place light dressing over injured eye only. Ask patient to try not to move eye. Phone triple zero (000) for an ambulance.

**Small object**

Ask patient to look up. Draw lower eyelid down. If object is visible, remove with a corner of a moist cloth. If not visible, pull upper lid down. If unsuccessful, wash eye with lukewarm normal saline or clean water. If still unsuccessful, cover injured eye only and seek medical aid.

**Penetrating or embedded object**

Lie patient on their back. Place thick pads above and below injured eye or cover object with a paper cup. Bandage eye pad in place making sure there is no pressure on eyelids. Cover injured eye only. Phone triple zero (000) for an ambulance.

**Do not**

- touch the eye or any contact lens
- allow the patient to rub the eye
- try to remove any object embedded in the eye or protruding from the eye
- apply pressure to the eye (e.g. when bandaging).

**Related Fact Cards**

- Hay Fever
- Sinus problems
- Vision Impairment
John Bell says

**Episcleritis**

Episcleritis is a localised area of inflammation involving superficial layers of the episclera. The episclera is a thin vascular membrane between the conjunctiva and the sclera (the white part of the eyeball). Symptoms of episcleritis are shown in Table 1. It occurs most often in young adults, and females are affected more than males.

Episcleritis is usually a mild condition that resolves spontaneously within three weeks. Discomfort can be relieved with eye lubricants and cold compresses. Recurrent episodes, or severe or worsening symptoms should be referred to a doctor or optometrist.1,11,24

**Blepharitis**

Blepharitis is a chronic inflammatory condition of the eyelid margins, which causes red, irritated, itchy eyelids and the formation of dandruff-like scales on eyelashes. The symptoms are shown in Table 1. Treatment involves eyelid hygiene (e.g. cleansing with a mild soap, such as diluted baby shampoo), gentle lid massage, and warm compresses. Blepharitis that does not respond to eyelid hygiene can be treated with antibiotics or topical corticosteroids.1

**Dry eyes**

Dry eyes are very common and the incidence increases with age. Dry eyes are more common in women, especially after menopause.

A tear film covers the normal eye surface and is composed of three intertwined layers:

- a thin, outer lipid layer secreted by the meibomian glands of the eyelids, which retards evaporation of the underlying aqueous layer and assists in uniform tear spreading
- a thick, middle aqueous layer produced by the lacrimal glands that contains proteins, electrolytes and water. It makes up about 90 per cent of the tear film volume. It nourishes and protects the corneal and conjunctival epithelium, maintains an appropriate pH and inhibits bacterial growth
- a thin, inner hydrophilic mucoid layer secreted by conjunctival goblet cells and the ocular surface epithelium. It acts as a wetting and stabilising agent, allowing tears to adhere to and spread evenly over the surface of the eyes.1,9,16,25

**Causes of dry eyes**16,25

Dry eyes are most often caused by inadequate production or increased evaporation of tears.

**Inadequate aqueous tear production**

Factors that can reduce tear production include:

- medications (see practice point 4)
- increasing age
- conditions affecting lacrimal gland function (e.g. lymphoma, Stevens-Johnson syndrome, trachoma)
- diabetes (causes decreased corneal sensation)

---

**Practice point 3**

**Babies and infants**

**Neonatal conjunctivitis**

Neonatal conjunctivitis is conjunctivitis that occurs in an infant in the first month of life. It is often caused by infection. It may be caused by *Chlamydia trachomatis*, *Neisseria gonorrhoea*, *Herpes Simplex* or another micro-organism that has been transferred from the infected mother to the neonate during birth. A neonate with symptoms of conjunctivitis or a mucopurulent eye discharge needs to be referred to a doctor.11,28

**Blocked nasolacrimal duct**

Some babies are born with a blocked nasolacrimal duct, which prevents normal drainage of tears. Symptoms of a blocked tear duct include a watery eye, tears running down the face, crusted mucus along eyelashes, discharge of mucous or pus and increased susceptibility to eye infections. The discharge is usually mucous from the tear film, rather than pus. Spontaneous resolution occurs in most infants by 6-12 months of age. Management includes frequent massage over the lacrimal duct and bathing with normal saline. Antibiotics may be necessary if infection is present.5,11,29

---

**Table 3: Some management options for suspected acute bacterial conjunctivitis.**1,21

<table>
<thead>
<tr>
<th>Management option</th>
<th>Patient group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consider immediate antibiotic therapy.</td>
<td>Health care workers</td>
</tr>
<tr>
<td></td>
<td>Patients in hospital or another health care facility</td>
</tr>
<tr>
<td></td>
<td>Patients with risk factors, such as immune compromise, uncontrolled</td>
</tr>
<tr>
<td></td>
<td>diabetes mellitus, contact lens use, dry eye or recent</td>
</tr>
<tr>
<td></td>
<td>ocular surgery</td>
</tr>
<tr>
<td></td>
<td>Children going to schools or day care centres that require antibiotic</td>
</tr>
<tr>
<td></td>
<td>therapy before returning.</td>
</tr>
<tr>
<td>Consider delaying antibiotic therapy, and use only if</td>
<td>Patients without risk factors who are well informed and have access</td>
</tr>
<tr>
<td>symptoms do not resolve after 1–2 days.</td>
<td>to follow-up care</td>
</tr>
<tr>
<td></td>
<td>Patients without risk factors who do not want immediate antibiotic</td>
</tr>
<tr>
<td></td>
<td>therapy.</td>
</tr>
</tbody>
</table>

---

**Table 3 (continued)**

<table>
<thead>
<tr>
<th>Management option</th>
<th>Patient group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consider delaying antibiotic therapy, and use only if</td>
<td>Patients without risk factors who are well informed and have access</td>
</tr>
<tr>
<td>symptoms do not resolve after 1–2 days.</td>
<td>to follow-up care</td>
</tr>
<tr>
<td></td>
<td>Patients without risk factors who do not want immediate antibiotic</td>
</tr>
<tr>
<td></td>
<td>therapy.</td>
</tr>
</tbody>
</table>

---

**Facts Behind the Fact Card**

**Red and dry eyes** Pharmacist CPD Module number 233
• refractive eye surgeries (e.g. laser-assisted in-situ keratomileusis (LASIK))
• Sjögren’s syndrome – which may be secondary to other medical conditions (e.g. rheumatoid arthritis)
• radiation therapy.

**Increased tear evaporation**

Factors that can increase tear evaporation include:

• conditions affecting meibomian gland number and function (e.g. blepharitis, acne rosacea, seborrheic dermatitis)
• disorders of eyelid aperture such as ectropion (turning outward of eyelid)
• low blink rate, which may be associated with excessive reading or computer work and some medical conditions (e.g. Parkinson’s disease)
• medications
• contact lens wear
• ocular surface disease (e.g. allergy)
• vitamin A deficiency.

Environmental factors such as sun, wind, dry air, hot blowing air and cigarette smoke can also cause or aggravate dry eyes.

**Symptoms of dry eyes**

Common symptoms of dry eyes are shown in Table 1. Symptoms can fluctuate in intensity and may be intermittent. Severe chronic dry eye can lead to descarcification of the corneal epithelium, ulceration and perforation of the cornea, an increased incidence of eye infections and vision impairment. It is important to diagnose and adequately treat dry eyes.

Dry eye is mainly a clinical diagnosis, but tests can confirm the diagnosis and determine the probable cause of the dry eyes. Tests for dry eyes include:

• tear break-up time (TBUT), determined by measuring the time lapse between instillation of fluorescein and appearance of the first dry spots on the cornea
• using staining agents such as rose bengal and fluorescein to detect epithelial damage to the cornea and conjunctiva
• Schirmer’s test to test aqueous tear production. It involves placing a strip of filter paper inside the lower eyelid, closing the eyes for five minutes and then measuring the amount of wetting on the paper strip
• measuring tear osmolarity.

**Treating dry eyes**

Lubricating eye drops, gels and ointments are the primary treatment for dry eyes. There is no evidence that any lubricant is superior to another. Tear evaporation may be reduced by using cold water humidifiers, wearing wrap around glasses and avoiding dry air (e.g. hair dryers, air conditioners). A person with a possible underlying cause for dry eyes (e.g. blepharitis, Sjögren’s syndrome, drug side effect) should be referred to a doctor or optometrist.1, 9, 16, 25

**Lubricating eye drops and gels (artificial tears)**

Hydrogels such as hypromellose, carmellose, polyvinyl alcohol, polyethylene glycol and various carboxomers are added to artificial tears for their demulcent properties and to increase viscosity, which prolongs contact time in the eye. Eye gels provide longer relief than eye drops, and blur vision less than ointments. Electrolytes and buffering agents are added to artificial tears to achieve and maintain appropriate tonicity and pH in the eye. Preservatives are added to multidose preparations to increase their shelf life. However, preservatives can irritate and damage the corneal and conjunctival epithelium. Benzalkonium chloride is the most irritant of the commonly used preservatives. If more frequent use is required a product containing a less irritant preservative or preservative-free single-use vial can be recommended. Less irritant preservatives include:

• oxyd (sodium chlorite, hydrogen peroxide)
• polyquad (polyquaternium-1)
• purite (oxychlooro complex)
• sodium perborate.

Preservative-free single-use vials should be recommended if the drops are to be used more than four to six times a day, or if the person is sensitive to preservatives. Single-use vials can be safely used more than once if uncontaminated and kept refrigerated, but must be discarded 24 hours after opening.

**Lubricating ointments**

Lubricating eye ointments (e.g. Duratears, Lacri-Lube, Poly Visc) contain mixtures of white soft paraffin, liquid paraffin and wool fat (lanolin). They do not contain preservatives.

**Practice point 4**

Medications that may cause or exacerbate dry eye symptoms9,25

• antiarrhythmics
• anticholinergics including:
  - sedating antihistamines (e.g. diphenhydramine, chlorpheniramine)
  - antispasmodics (e.g. diphenoxylate, dicyclomine, hyoscyamine)
  - tricyclic antidepressants
  - phenothiazines
  - mydriatics (e.g. atropine, homatropine, tropicamide)
  - antiparkinsonian agents (e.g. benztropine)
  - oxybutynin.
• beta-blockers
• benzodiazepines
• diuretics
• isotretinoin
• oral contraceptives and hormone replacement therapy (HRT)
• opioids (e.g. morphine, codeine)
• preservatives in eye drops.
Practice point 5

Vasoconstrictor (decongestant) eye drops

Vasoconstrictor eye drops contain an alpha-adrenoreceptor agonist such as naphazoline, phenylephrine or tetrahydrozoline. These drugs constrict conjunctival blood vessels, which can reduce eye redness and congestion. They are marketed for the relief of eye redness and discomfort due to minor eye irritation, such as that caused by dust, smoke, swimming, eye strain and colds. However the benefits of these products are uncertain and they can cause side effects. They commonly cause stinging on instillation and rebound hyperaemia. Rebound hyperaemia can lead to overuse. Long term use (over months) can cause acute and chronic conjunctivitis. Vasoconstrictor eye drops should not be used for more than five days in a row.

They are generally used when a more prolonged contact time is needed (e.g. to alleviate more severe symptoms or for use at night in conjunction with daytime use of eye drops). They may cause blurred vision. Some people are sensitive to lanolin, so it is important to ask about allergies if recommending one of these products. Lacrilube (lanolin-free) or one of the more viscous hydrogel products can be recommended for people who are sensitive to lanolin.

For instructions on the correct use of eye drops, gels and ointments refer to AFP22 or the Red and Dry Eyes Fact Card. Advise customers to discard multidose eye drops and ointments 28 days after opening.

Liposome eyelid spray

Liposome eyelid spray (e.g. Tears Again) contains liposomes of phospholipids, fatty acids and vitamins A and E. It is sprayed onto the closed eyelid. It is thought that the liposomes migrate onto the tear film where they stabilise the outer lipid layer, reducing tear evaporation.

Anti-inflammatory agents

Inflammation associated with dry eye can be treated with:

- corticosteroid eye drops
- cyclosporin eye drops. Cyclosporine 0.05% ophthalmic emulsion (e.g. Restasis) is marketed in the USA, but is not yet marketed in Australia.

Some evidence suggests that higher dietary intake or oral supplements of omega 3 fatty acids can prevent dry eye syndrome and improve dry eye symptoms, possibly due to anti-inflammatory effects.

Some other therapies

- Punctal plugs can be inserted into the puncta to block them. The ‘puncta’ are the openings of the tear ducts on the eyelid margin. Punctal plugs prevent the tears from draining out through the tear ducts.
- ‘Serum’ eye drops, which are prepared using the patient’s own blood. Serum eye drops are used for severe dry eyes with punctate epithelial defects and corneal damage. They can promote reepithelialisation and increase mucin production.
- Meibomian gland dysfunction can be treated with warm compresses, eyelid scrubs and oral doxycycline (100–200 mg daily).

Pharmacists can read the Counter Connection article in this issue of inPHARMation for additional information.

References

18. Product information. eMIMS. Sydney, Australia; CMPMedica Australia; Aug 2012.
Assessment questions for the pharmacist

Select one correct answer from each of the following questions.

Answers due 28 February 2013.

Before undertaking this assessment, you need to have read the Facts Behind the Fact Card article and the associated Fact Cards. This activity has been accredited by PSA as a Group 2 activity. Two CPD credits (Group 2) will be awarded to pharmacists with four out of five questions correct. PSA is authorised by the Australian Pharmacy Council to accredit providers of CPD activities for pharmacists that may be used as supporting evidence of continuing competence.

Submit answers online

To submit your response to these questions online, go to the PSA website www.psa.org.au/selfcare

---

1. Choose the MOST appropriate statement.
   a. Viral conjunctivitis usually causes a gritty or burning feeling and watery discharge.
   b. Allergic conjunctivitis usually causes itching and severe photophobia.
   c. Irritant conjunctivitis usually causes a burning or foreign body sensation and no discharge.
   d. Bacterial conjunctivitis usually causes a gritty or burning feeling and severe photophobia.

2. A 23 year old man comes into your pharmacy on a Friday afternoon to ask for your advice. His left eye has been very red, weepy and painful for the past 24 hours. He has been studying for exams and he has a bad headache. He wears contact lenses. What is the MOST appropriate advice to give him?
   a. Advise him to see doctor or optometrist today or tomorrow.
   b. Advise him to stop wearing his contact lenses and see a doctor or optometrist today.
   c. Advise him to use some preservative-free lubricant eye drops and see his doctor if his eye has not improved in 48 hours.
   d. Advise him to stop wearing his contact lenses, use some chloramphenicol eye drops and see his doctor if his eye has not improved in 48 hours.

3. Choose the CORRECT statement.
   a. Viral conjunctivitis is not usually contagious.
   b. Dry eyes can be caused by a high blink rate associated with excessive computer work.
   c. Delaying chloramphenicol treatment is an option for many cases of acute bacterial conjunctivitis.
   d. Naphazoline eye drops can be safely used every day for up to two weeks.

4. Choose the CORRECT statement about acute bacterial conjunctivitis.
   a. Chloramphenicol eye drops can treat conjunctivitis caused by Pseudomonas species.
   b. Acute bacterial conjunctivitis usually affects only one eye.
   c. The dose of chloramphenicol eye drops is 2 drops SIX times a day for seven days.
   d. In adults viral conjunctivitis is more common than bacterial conjunctivitis.

5. An elderly lady comes into your pharmacy to ask for your advice about her red eyes. She tells you they feel gritty and tired, and are weepy. She has had these symptoms since the start of spring two weeks ago. You remember that she started on oxybutynin tablets three weeks ago. What is the MOST appropriate advice to give her?
   a. Advise her to try Naphcon A eye drops every day, as she may have allergic conjunctivitis.
   b. Advise her to see her doctor as soon as possible, as she may have blepharitis.
   c. Advise her to try some lubricant eye drops every day, as dry eyes are common in elderly women.
   d. Advise her to try some lubricant eye drops and see her doctor, as she may be experiencing a side effect of oxybutynin.