OPTOMETRY

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SUPPLEMENT TO AUSTRALIAN OPTOMETRY JUNE 2008

- Allergic conjunctivitis
- Toxic keratopathy
- Therapeutics in a contact lens practice
- Trypan blue
- Plaquenil

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- soothing protection from the symptoms of dry eye[1-3]
- suitable for use with all types of contact lenses[3]

PBS Information: Restricted benefit. Severe dry eye including Sjöegren's Syndrome.

Further product information is available on request.

References: 1. US FDA 21CFR349 - Ophthalmic drug products for over-the-counter human use. 1 April 2006. **2.** Tauber J. Efficacy, tolerability and comfort of a 0.3 % hypromellose gel ophthalmic lubricant in the treatment of patients with moderate to severe dry eye syndrome. Curr Med Res and Opin 2007; 23: 2629-2636. **3.** Chalmers RL. A Review of the Metabolism of Hydrogen Peroxide by External Ocular Structures. *ICLC*. 1995; 22:143-147. **Novartis Pharmaceuticals Australia Pty Limited.** 54 Waterloo Road, North Ryde, NSW 2113, Australia Phone (02) 9805 3555 Fax (02) 9805 0609 Medical Infomation and Communication 1800 671 203 ABN 18 004 244 160. NVO_Gen46_01/08 NOVGEN043

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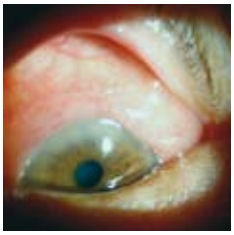
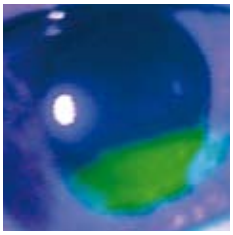
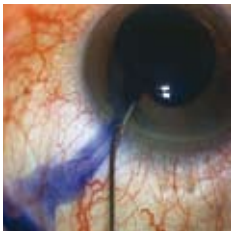
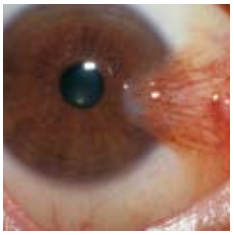
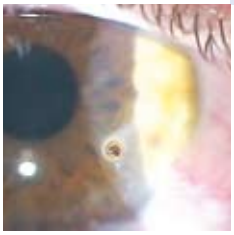

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Acute allergic

Case report

William H Trinh
BOptom OD

An anxious woman was referred by her local general medical practitioner to her regular optometrist for consultation due to non-improved conjunctival chemosis and eyelid oedema from topical steroid eye-drops. The 72-year-old was confirmed to have severe acute allergic conjunctivitis and advised to continue Fluorometholone eye drops with increasing initial dosing. Her condition improved significantly after four days and completely resolved after two weeks.

According to a recent publication, as much as 50 per cent of the population may currently suffer from allergy.[1] This represents a significantly increased number of individuals than the 20 to 30 per cent that was suggested just a few years ago.[2] Allergy is reaching near-epidemic proportions in many parts of the world, including Australia.

A number of theories has been proposed to explain this unusual phenomenon. One theory is that increasing pollution worsens the overall air quality of numerous industrialised nations.[3]

It has been suggested that the increase in allergic disorders represents a direct immunological response to various airborne toxins in our environment. Evidence for this theory comes from the fact that allergy is far less common in underdeveloped, agricultural countries than in developed countries.

Another popular theory is the so-called 'hygiene hypothesis' [4,5] that proposes that improved hygiene in developed countries may actually be detrimental to health. This theory holds that childhood infections by gastrointestinal worms and other microbes are necessary to stimulate normal immune system development.

Children living in a 'too clean' environment are prone to producing immune cells that are undifferentiated and poised for attack; without a proper target, they are likely to be triggered by environmental antigens that might otherwise induce only a minor, limited toxicity. This exaggerated response or hypersensitivity to normally innocuous substances is what defines the allergic reaction.

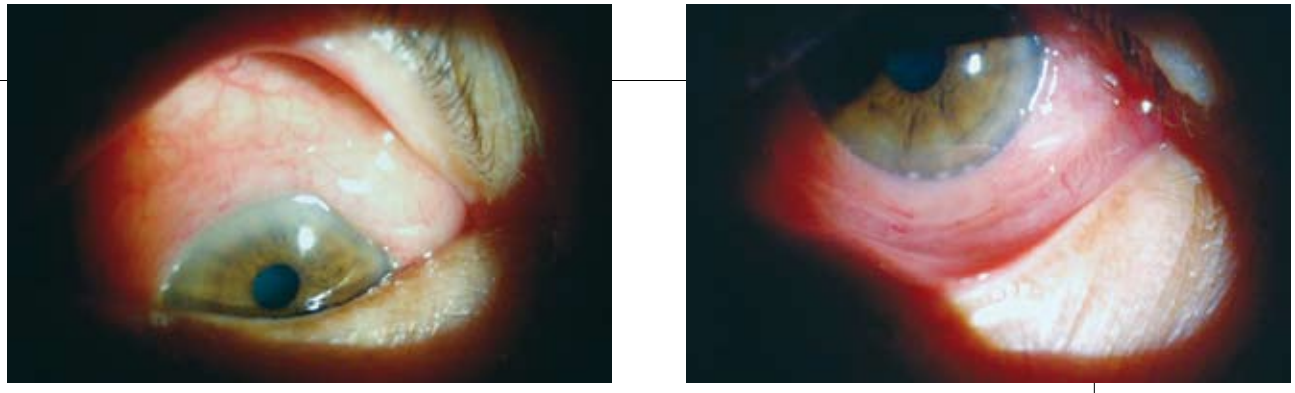
Of all the manifestations of allergy, allergic conjunctivitis is among the most common and is estimated to affect about 20 per cent of the population annually.[6,7,8] One study showed that in patients with allergic rhinitis, 75 per cent of subjects reported associated involvement of ocular tissues.[9]

More recently, a Gallup survey found that as many as 83 per cent of allergy sufferers manifest ocular symptoms. They often present to optometrists' practices,[10] especially during Spring.

The impact of the allergy goes beyond ocular irritation and inconvenience; in fact, the consequences can profoundly affect an individual's quality of life. Patients with allergic disorders commonly report concurrent problems such as headache, fatigue, impaired concentration and learning, insomnia and reduced productivity.[11,12]

Acute allergic conjunctivitis is a type I hypersensitivity response and caused by a series of external irritants. Type I hypersensitivity response represents a humoral immunity or an immediate reaction in which B lymphocyte was stimulated by the allergen to release IgE. Subsequently mediators such as histamine, serotonin, eosinophil chemotactic factor, neutrophil chemotactic factor, proteases, leukotriene, prostaglandins, bradykinin and cytokines are released to induce inflammation. Histamine from mast cells is a preformed mediator, stimulates H_1 receptors in conjunctiva and produces vasodilation, increased vascular permeability and itching.

To ascertain the origin of the irritants often is not possible, especially in the acute and isolated episode. The diagnosis is often made by history and clinical presentations. The main therapy is to avoid allergen, remove the allergen and relieve the symptoms as soon as possible with topical medications. The choice of treatment is very much dependent on the severity of allergic conjunctivitis presented.



Allergic conjunctivitis Day 1

conjunctivitis

This case highlights the effectiveness, safety and importance of tapering dosage of the topical steroid in the treatment of severe acute allergic conjunctivitis

Case study

A 72-year-old Asian female patient CLM had a history of left eye red, watery, swollen and itchy for two days. She had presented to her local general medical practitioner who diagnosed her allergic conjunctivitis and subsequently prescribed her Fluorometholone Acetate (Flarex) eye drops to be used twice daily in the left eye.

The patient returned next day to the GP with increased swelling, redness and itchiness of left periorbital skin without pain, blurring or discharge. The GP was concerned and referred the patient to her regular optometrist WHT for consultation.

Her ocular history included mild bilateral nuclear sclerotic cataracts and pterygium. Her general medical history included hypertension, osteoporosis and hypercholesterolemia. Her current medications were Coversyl plus and Lipitor and Fosamax. There was no history of medications or environmental allergy.

On examination, her unaided vision was 6/15 in each eye and pinholes 6/12 in each eye. Her pupils were round, equal and responsive to light. Extraocular muscle movement was full and unrestricted.

Anterior segment slitlamp examination revealed left eye grade 3+ bulbar conjunctival hyperaemia, tarsal papillae and grade 4+ chemosis. There was grade 2+ periorbital erythema and oedema. There was no anterior chamber reaction. There was no corneal defect. Intraocular pressures were 12 mmHg in each eye. Cataracts and pterygium were unchanged from last eye examination. Dilated fundus examination was unremarkable.

The following conditions were considered for differential diagnosis.

- **Orbital cellulitis**

Patient often has symptoms of unilateral red, painful eye with blurred vision, headache and double vision.[13] Clinical signs are eyelid oedema, erythema, warm, tenderness, conjunctival chemosis and injection, proptosis and restricted eye movement with pain, fever, optics disc oedema and purulent discharge. Possible causes include sinus infection, orbital infection or orbital trauma.

- **Preceptal cellulitis**

Patient often has symptoms of tender, red and sore eye lid with mild fever. Clinical signs are eyelid erythema, oedema, warm and tenderness. There should not be any restriction or pain on eye movement. Possible causes include lid laceration, retained foreign body from trauma or extension from sinus infection, dacryocystitis and chalazion.

- **Bacterial conjunctivitis**

Patient would often report red and irritated eye with discharge. Clinical signs are purulent discharge with conjunctival papillae. Most common causes are *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Streptococcus pneumoniae* and *Haemophilus influenzae*.

- **Acute allergic conjunctivitis**

Patient would report red, watery, itchy and swollen eye. Clinical signs include conjunctival chemosis and papillae, and string mucous discharge.

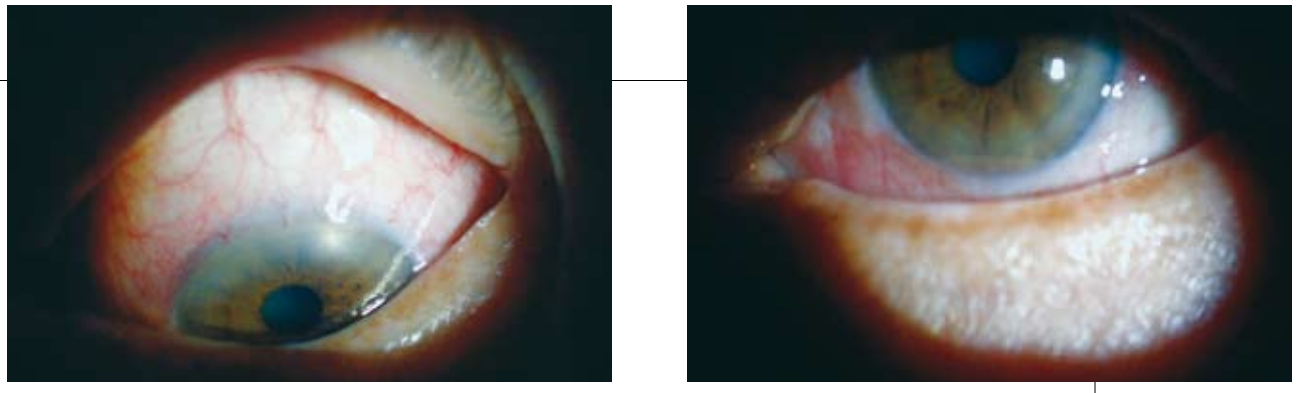
Diagnosis, management

The patient was diagnosed with severe acute allergic conjunctivitis in the left eye. She was advised to continue Flarex drops every hour on day one, every two hours on day two and four time a day thereafter. Patient was re-examined on day four with significantly reduced chemosis, conjunctival hyperaemia and periorbital oedema. Her IOP was 12 mmHg. She continued Flarex QID OS and the allergic conjunctivitis completely resolved on day 14.

Discussion

In this case, the patient was referred by the GP to the optometrist due to the severe conjunctival chemosis with eyelid erythema and oedema and the eye did not respond well to Flarex BID dosing. However, the patient was quickly ruled out of orbital cellulitis as she did not have reduced vision, fever

Continued page 4



Allergic conjunctivitis Day 4

Acute allergic conjunctivitis

From page 3

or pain on eye movement. There was no evidence suggestive of preceptal cellulitis as eye lid looked clear from any laceration or infection. The bacterial conjunctivitis was also ruled out as there was no purulent discharge. The conjunctival chemosis and papillae with symptoms of watery and intensely itchy eyes was the hallmark of allergic conjunctivitis.

Because it is an acute and isolated episode of allergic conjunctivitis, it is unnecessary and uneconomical to ascertain which irritant or irritants are causing the allergy. The treatment of the acute allergic conjunctivitis is very dependent on the severity of the clinical presentation and symptoms. The treatment options range from cold compresses, preservative free artificial tears, astringent (tetryzoline and naphazoline), antihistamine, mast cell stabiliser and surface-acting cortisone (fluorometholone).[14]

The itchiness comes from the release of the mediator histamine from conjunctival mast cells and can be relieved using antihistamine drops. Over-the-counter vasoconstrictors are not advised to be used because their short duration of action often encourages multiple instillations. This, in turn, may result in rebound conjunctival hyperaemia and exacerbate the redness they are trying to eliminate.[15] Mast cell stabilisers have no role in acute allergy but are used for long-term preventive and maintenance therapy.[16]

The conjunctival chemosis and eyelid oedema are due to many mediators such as histamine, prostaglandins and other allergy mediators induced by an IgE-dependent stimulus,[17] and can be relieved quickly only by cold compresses and steroid drops.

Steroid inhibits phospholipase A2, which prevents biosynthesis of arachidonic acid and subsequent formation of prostacyclin, thromboxane A, prostaglandins and leukotrienes.[17] The steroid is able to control swelling, vasodilatation, migration of eosinophils and release of granules from the mast cells. The severity of this case justified starting with an initial high dose[10] of steroid and tapering the dose to relieve the oedema.

Fluorometholone is a weak steroid and safe to use over a short period, with rare incidence of elevated intraocular pressure[10] and cataract. Studies with Fluorometholone acetate show it is metabolised slowly compared to the alcohol derivative.[18] Clinical evaluation of patients with conjunctivitis, episcleritis, and scleritis indicates that fluorometholone acetate improves clinical signs and symptoms of inflammation significantly more than fluorometholone alcohol.[19] However, GPs are often hesitant to prescribe topical steroid for fear of secondary steroid complications,[20] which is often due to GPs' limited access to instruments to properly monitor intraocular pressures and cataract.

Acute allergic conjunctivitis, especially in a severe case with conjunctival chemosis and eyelid oedema, can be intriguing for differential diagnose. Proper diagnosis and appropriate, prompt treatment will not only relieve the patient's discomfort and anxiety but also reduce their loss of productivity.

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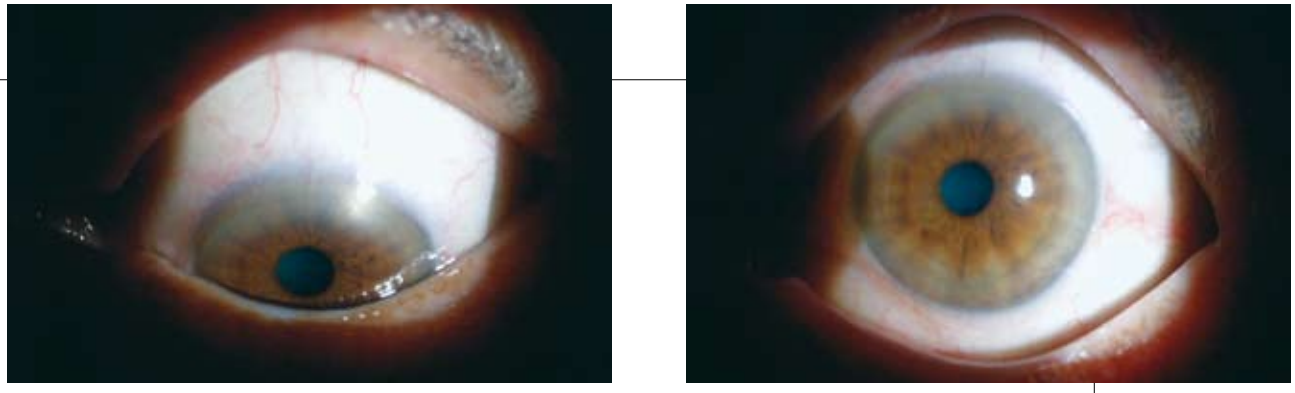

Allergic conjunctivitis Day 14

Vision damage and erectile dysfunction medication

The phosphodiesterase (PDE) 5 inhibitors have gained widespread use for the treatment of erectile dysfunction due to their safety, efficacy and ease of use. The three most common oral PDE 5 inhibitors are sildenafil (Viagra), vardenafil (Levitra) and tadalafil (Cialis). All three have been implicated in both transient and permanent visual changes.

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USA

Sectoral disc oedema with flame-shaped haemorrhages in a patient with NAION
(Reprinted with permission: Skorin L. Erectile dysfunction drugs and optic neuropathy: is there a link? *Consultant* 2006; 46: 166-168)

PDE 5 inhibitors were first noted to cause a temporary bluish or blue-green tinge or haze and a sensation of increased light sensitivity and brightness. These aberrations in colour and luminosity appear to be the most common symptoms found with the use of these drugs.

Besides inhibiting PDE 5, these erectile dysfunction medications also inhibit PDE 6, which is an enzyme found in the rod and cone photoreceptors in the retina. Because PDE 6 is involved in phototranduction, its inhibition may be the underlying cause of the colour and light sensitivity changes that some patients experience.

Other benign and temporary ocular symptoms and signs include diminished colour vision, dark colours appearing darker, blurred vision, central vision haziness, flashing lights, especially when blinking, transient electroretinography (ERG) changes, conjunctival injection, ocular pain and photophobia.

More permanent changes with the use of these agents include pupil-sparing third cranial nerve palsy, central serous chorioretinopathy, serous macular detachment, branch retinal artery occlusion and other retinal vascular events. Intraocular pressure does not appear to be affected by these medications.

The question of whether the PDE 5 inhibitors cause the ischemic disorder of the optic disc known as non-arteritic anterior ischemic optic neuropathy (NAION) is still open to debate as a direct link has not been formally established.

The physiological action at the optic nerve head by these agents could be explained by a modification of retinal blood flow related to their pharmacological effects. Also, NAION, erectile dysfunction and even cardiovascular disease all share common risk factors: older age, dyslipidemia, diabetes, hypertension and cigarette smoking.

NAION is characterised by a sudden, painless, monocular loss of vision. It is most often noticed on waking because of compromised blood flow causing infarction of the prelaminar portion of the nerve in the early morning hours.

There is a typical segmental swelling of the optic disc and splinter haemorrhages may be present. Visual field examination often reveals altitudinal field defects, but arcuate, nasal step and cecocentral defects also can exist. Eventually, optic atrophy and permanent vision and field loss develop.

The optic nerve heads in these patients have a small cup-to-disc ratio and are known as the disc-at-risk. Since the involved eye typically exhibits an oedematous optic nerve head, the patient's contralateral uninvolved eye must be closely evaluated to identify this structural anomaly. If the fellow eye has a small cup-to-disc ratio, then it is at risk of developing NAION in the future.

Any elderly patient who presents with a swollen optic disc and vision loss must first have temporal (giant cell, cranial) arteritis ruled out. Besides the vision loss and afferent pupillary defect, patients with temporal arteritis often have an accompanying headache, scalp tenderness, pain on jaw movement, polymyalgia rheumatica, weight loss, fever and malaise. They will also have an elevated erythrocyte sedimentation rate and C-reactive protein and often exhibit anaemia on their complete blood count.

Because the PDE 5 inhibitors can cause transient decreases in systolic and diastolic blood pressure, a hypotensive crisis at the anterior optic nerve head that leads to an NAION attack may put patients with pre-existing factors at risk for vision loss. There may be a host of other unforeseen causes that lead to the NAION when other types of phosphodiesterase are inhibited.

We know that there is a statistically significant association between the use of these drugs and NAION in men with a history of myocardial infarction and a significant association in men with a history of hypertension. Optometrists should warn men with these conditions about their potential risk of vision loss.

PDE 5 inhibitors should be avoided in men who have already experienced NAION in one eye, men who have a history of previous heart attack, men who have high blood pressure and possibly those who on funduscopy exhibit a disc at risk—a small, crowded optic disc with a small or non-existent physiologic cup.

Patients who experience visual field or acuity loss during use of these drugs should discontinue the medication and seek prompt ophthalmic assessment.

Christmas Eye

acute toxic keratopathy

Debilitating pain disproportionate to the corneal trauma involved can severely affect a patient for 48 hours

Case report

Robert Holloway
BScOptom

In late November 2006, a 38-year-old male presented in the morning with extreme pain in his right eye. Onset was in the early hours of the morning and had caused him to wake. He was experiencing severe photophobia, lacrimation and was holding his face and shielding his eyes from any light.

He denied any trauma or machinery use but did indicate that he had been mowing his lawn the previous day. His previous ocular history was unremarkable and his general health was excellent.

The right eye showed a very large area of corneal epithelial loss totalling about 30 per cent of the corneal surface (Figure 1).

The conjunctiva showed marked amounts of chemosis and injection and there was a moderate anterior chamber reaction with 1+ cells.

Visual acuity was R 6/15 L 6/6.

NaFl stained the lesion and penetrated into the stroma staining the full corneal thickness in the area under the lesion (Figures 2 and 3).

Diagnosis

Mr DR was diagnosed with a right acute toxic keratitis, known locally as 'Christmas Eye'. This is seldom referred to in the literature but is widely known in the medical and optometric community in north-east Victoria and southern New South Wales.[1,2]

The majority of patients experiencing this condition are male and have a history of outdoor activity in grassland or bush in the previous 24 hours.

Symptoms include:

- debilitating severe pain
- photophobia
- excessive lacrimation
- reduced acuity.

Clinical signs include:

- extensive loss of corneal epithelium and Bowman's layer
- corneal oedema
- NaFl staining of stroma
- conjunctival chemosis and oedema.

Management

Topical amethocaine was instilled to relieve the pain and facilitate a thorough examination of the eye. NaFl was instilled to demarcate the area of epithelial loss.

A silicone hydrogel bandage contact lens was inserted (Bausch & Lomb PureVision) and the following medications prescribed:

- diclofenac sodium (Voltaren Ophtha) q1h
- ciprofloxacin hydrochloride (Ciloxan) q4h
- homatropine 2% q4h
- paracetamol 500 mg and codeine 8 mg (Panadeine) orally qid.

A review in two days was scheduled.

Two days later, DR reported markedly reduced pain, improved vision and no photophobia. Biomicroscopy showed only slight chemosis, no anterior chamber reaction and a small horizontal linear stain on the cornea.

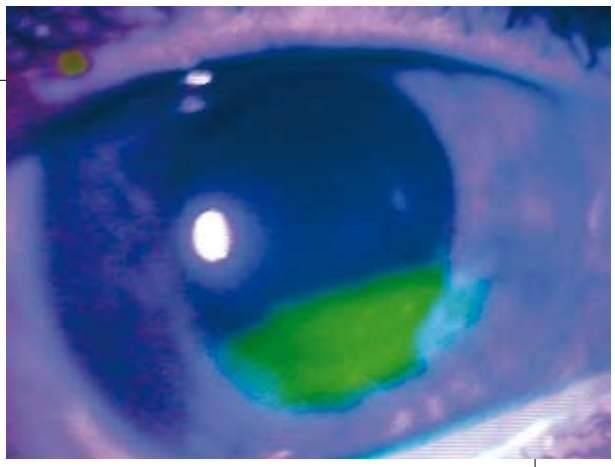

Figure 1. NaFl staining of corneal lesion

Figure 2. Corneal section showing NaFl stain in stroma

Figure 3. Corneal section showing NaFl stain in stroma

The contact lens was removed, homatropine and ciprofloxacin were ceased and diclofenac was reduced to q4h for five days before being discontinued.

On review one week later, there was no evidence of any corneal insult having occurred. There was no scarring or staining and the eye was quiet.

Discussion

Christmas Eye occurs during the hot, dry Summer months and while its exact mechanism is unknown, it is thought to be a toxic reaction to contact with an insect.

The key feature is pain, often described as 'the worst ever'. Often the pain level is greater than would be expected given the degree of corneal trauma. The initial inflammatory pain response precedes the corneal staining and is added to by the epithelial loss.[3] The loss of corneal epithelium and Bowman's layer creates the unusual staining pattern.

The impact on normal life is significant and prior to the current management, the patient would be incapacitated, unable to work and severely compromised in their daily activities for 48 hours.

Medication choices

Diclofenac is a nonsteroidal anti-inflammatory and is known to reduce moderate to severe pain associated with corneal lesions. A conventional bottle was chosen over unit doses for cost-effectiveness and due to the high intensity use over a short time.

Ciprofloxacin is a fluoroquinolone antibiotic active against a broad spectrum of gram positive and gram negative ocular pathogens. This is the most appropriate choice as the damaged epithelium renders the cornea susceptible to gram positive and gram negative infections.[4] While the eye is not infected, the antibiotic is provided as cover to reduce the risk of opportunistic infection.

Homatropine will negate any ciliary spasm and further alleviate the pain levels. Paracetamol and codeine is available without prescription and provides excellent pain relief.

Pain management

The speed of corneal healing is well known and this condition is essentially self-limiting. The key to treating this man was to control his pain until the cornea was re-epithelialised.

All intervention other than the antibiotic is designed to reduce the pain associated with this condition. Each particular drug reduces pain through a different mechanism, at differing sites and all are complementary.[5]

The eye heals within 10 days without scarring and with no residual after-effects.

The particular circumstances involving this case may have limited applications in other parts of Australia where such a phenomena is unknown. Corneal abrasions are relatively common in optometric practice but this case demonstrates how effective the use of bandage SiH contact lenses and topical NSAIDS can be in the management of corneal abrasions.

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Collagen cross-linking for keratoconus

A relatively simple technique, impregnating the cornea with vitamin B2, shows promise in slowing and perhaps halting the progression of keratoconus

How many times have you engaged in the following scenario? A young patient attends with evidence of progressive visual loss, a history of atopic disease and eye rubbing, and you diagnose progressive keratoconus.

Until recently, the management of this patient would involve counselling the patient to avoid eye rubbing, treatment of any allergic eye disease, and the prescription of glasses or gas-permeable contact lenses. If these were insufficient in providing adequate comfortable vision, then a surgical option such as Intacs intrastromal rings, or deep anterior lamellar or penetrating keratoplasty could be considered.

With the availability of collagen cross-linking we now have therapeutic modality, which shows some promise in halting or at least slowing the progression of keratoconus.

The technique is relatively simple and involves the impregnation of the cornea with riboflavin, which is vitamin B2. Drops are applied to the cornea until there is evidence that the riboflavin has soaked through into the anterior chamber. A calibrated ultraviolet light source is then applied to the cornea for 30 minutes.

The riboflavin plays two roles. First, the interaction of the riboflavin and the ultraviolet radiation produces oxygen free radicals, which induces the collagen fibrils to cross-link (Figures 1 and 2). The second role is absorbing all the ultraviolet radiation so that there is no risk to the endothelium or other intraocular structures.

There are some variations in the surgical technique, with advocates for both epithelial removal and no epithelial removal prior to the treatment. The removal of the epithelial barrier allows more riboflavin to soak into the cornea, therefore theoretically providing a higher chance of deeper cross-linking.

There is some risk with epithelial removal, with some recent studies suggesting efficacy can at least be obtained without the need for epithelial debridement. If maximum effect is sought, then epithelial removal to the central 6-7 mm is critical.

Guidelines for referral of patients

Patient suitability for the cross-linking procedure is considered on a case-by-case basis but generally the suitability criteria are:

- patient has a keratoconus that is showing progression
- central corneal thickness is 400 microns or more
- endothelial cell count is normal.

We believe the collagen cross-linking should be reserved for those patients who show evidence of progression in their keratoconus. It is not suitable for any patient who has a corneal thickness of less than 400 microns, and it is essential to explain to the patient that the main purpose is to slow or halt the progression of the disease and hopefully to put off the need for a deep lamellar or penetrating keratoplasty.

At The Eye Institute this treatment has been performed as part of a prospective Ethics Committee approved trial, and there have been no complications to date. The published literature on the efficacy of this treatment is relatively limited.

The original work was performed at the University of Dresden in Professor Theo Seiler's department. Drs Wollensak and Spoerl were the chief investigators, and published several papers between 1998 and 2005 on the safety and efficacy of this treatment.

The clinical series was relatively small, but Wollensak was able to demonstrate some stability of the progression of the keratoconus, and in some cases a degree of flattening of up to two dioptres. The critical aspects of the research from this department

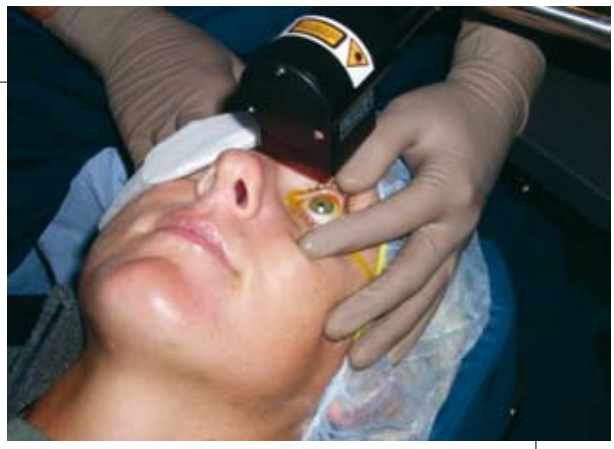

Figure 1

treatment

Gerard Sutton
MB BS FRANZCO FRACS
Steve Zantos
BOptom PhD FAAO
The Eye Institute, Sydney

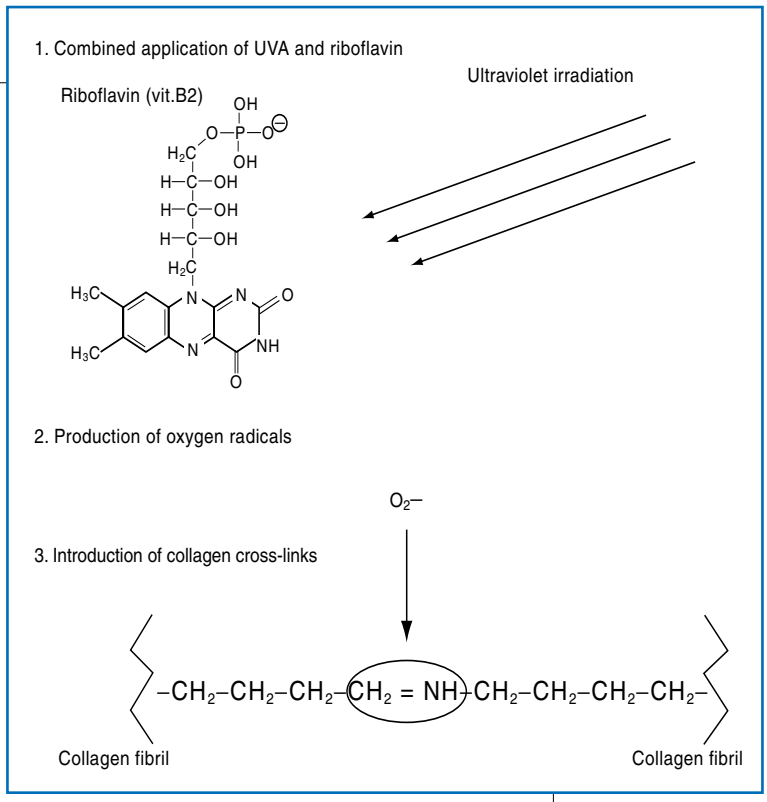

Figure 2

were that they showed good evidence of little risk of toxicity if the depth parameters and protocols were followed.

Caberossi et al (*Journal of Cataract and Refractive Surgery* 2006) have also demonstrated some degree of flattening in a certain number of patients undergoing this treatment.

The results of these studies have meant that in Europe, at least, the technique is now available for widespread use, and it has a CE mark. Clinical trials have now started under Food and Drug Administration (FDA) protocols in the United States, and here in Australia individual approval can be sought via the Therapeutic Goods Administration (TGA).

It should be done by a corneal surgeon who has experience in the management of keratoconus, and who is able to accurately assess which patients are indeed at risk of progressing to the point where they require major surgical intervention. The weight of evidence is at least suggestive that there is some efficacy in this treatment and, given the good safety profile, it can continue to be offered to this specific sub-group of patients.

Given the excellent safety profile that has been demonstrated to date, and the fact that for many of these younger patients we have nothing else to offer, collagen cross-linking is a reasonable treatment to deliver in certain circumstances.

Perhaps the best design study in the world is underway in Melbourne under the supervision of Dr Christine Wittig. The early results are promising, but it must be emphasised that this technique is investigative, and there is a difference of opinion even within Australia about whether its efficacy has been proved and whether it should be available for widespread use.

Given the excellent safety profile that has been demonstrated to date, and the fact that for many of these younger patients we have nothing else to offer, collagen cross-linking is a reasonable treatment to deliver in certain circumstances.

Optometrists who have patients whom they believe would benefit from this technique should identify the surgeon or surgeons within their state who have had experience with the technology and who are approaching it with an academic and cautious mindset.

Collagen cross-linking has also been used to treat ectasia following refractive surgery and to prevent corneal melting in various disease processes. The evidence in support of these applications is again relatively thin in the peer reviewed literature. The Eye Institute uses the technique in these patients when the only alternative is a likely penetrating keratoplasty.

It is possible that we will find a sub-group of keratoconic patients who do respond to collagen cross-linking, and another group for whom it is redundant. The secret will be to identify which patients will benefit from the treatment. A marker for progressive keratoconus is needed.

At the Sydney Eye Hospital there is research underway on a range of potential markers that may provide a way of detecting not only which patients with keratoconus may progress, but which patients should never have any form of refractive corneal surgery.

Collagen cross-linking is an exciting new treatment for progressive keratoconus. It remains an investigational procedure. We wait anxiously for the result of larger long-term clinical studies to ascertain whether it will realise its extraordinary promise.

Glaucoma shared-care guidelines in NSW

Therapeutically-endorsed optometrists in New South Wales can now prescribe topical glaucoma preparations after shared-care guidelines were finalised, facilitating the comanagement of glaucoma patients by optometrists and ophthalmologists.

Under the guidelines, optometrists will refer patients who have been diagnosed with glaucoma to an ophthalmologist, who will confirm the diagnosis and develop a management plan for the patient's ongoing treatment. The optometrist will then monitor the patient and prescribe topical glaucoma medications as part of their ongoing treatment.

Optometrists Association NSW Division executive director Andrew McKinnon said patients would benefit from the shared-care model.

'This will enable optometrists to provide care to patients in conjunction with a comanaging ophthalmologist at a time, place and price that is convenient to the patient,' he said.

The guidelines were jointly endorsed by the state's Optometrists Registration Board, the University of New South Wales (UNSW) School of Optometry and Vision Science, and the Royal Australian and New Zealand College of Ophthalmologists (RANZCO).

They were drafted after an order was published in the NSW Government Gazette in December 2005 by the then chief health minister, allowing optometrists to access and use several medications in their practice.

The order stated that topical glaucoma medications listed in Group 5 (see panel) could be used by optometrists only after shared-care guidelines had been agreed on by the three parties.

Although discussions between optometrists and ophthalmologists are yet to take place, McKinnon hopes greater interaction between the two groups as a result of the shared-care model will encourage RANZCO to facilitate clinical placements in NSW hospitals for optometrists enrolled in the Postgraduate Certificate in Ocular Therapeutics course at UNSW.

'We really need RANZCO's support to find placements in the public hospital system for optometrists,' he said.

Currently, optometrists undertaking the course must travel interstate for their clinical placements.

There are seven therapeutically-endorsed optometrists in NSW who will be able to prescribe topical glaucoma preparations under the guidelines, with another 25 optometrists soon to join them following the completion of their UNSW therapeutics training course.

Group 5 topical glaucoma preparations

Apraclonidine
Betaxolol
Bimatoprost
Brimonidine
Brinzolamide
Carbachol
Dipivefrine
Dorzolamide
Latanoprost
Levobunolol
Pilocarpine
Timolol
Travoprost

Chris McMahon sees practice from a different perspective since he completed the clinical component of his therapeutic endorsement in ophthalmologists' rooms

Gary Oshry

Unlike most therapeutically endorsed students graduating today who do their obligatory clinical training rotation in a hospital, McMahon undertook his clinical rotation under the supervision of seven ophthalmologists in various practices in the Gold Coast area.

McMahon found that the ophthalmologists were most helpful. The seven doctors agreed to take him under their wing, involved him in the diagnosis of patients and discussed alternative methods of treating each patient therapeutically. With the patient's consent, McMahon also examined the patient with the slitlamp and ophthalmoscope.

McMahon says that nothing compares to one-on-one interaction to forge closer long-term trust between the two professions.

'Therapeutics will foster much closer relations between optometrists and ophthalmologists, which will ultimately streamline the eye-care system in Australia. Apart from the patients, ophthalmologists will also benefit once they realise how they can more effectively take advantage of the capabilities optometrists have acquired with the therapeutic endorsement. In addition, we are easing their burden of conducting diabetic, glaucoma and red eye screening,' he said.

'Ocular therapeutics is not a science, it's an art, just like medicine. Everything does not go according to a picture in a text book or a check-list of symptoms. Every case is

J-curve

open to interpretation and carries different complications and potential for complications. It is the responsibility of the practitioner to sum up all these factors and ascertain the most appropriate diagnosis.'

Since doing his clinical rotation in ophthalmologists' practices, McMahon has restructured the patient flow in his own two practices.

'Ophthalmologists rely on staff members to collect data by taking retinal photographs, visual fields, eye pressures, OCT scans and determine case histories,' says McMahon. 'The ophthalmologist will walk from one room to another looking at a summary of data and then make a diagnosis.'

McMahon has adopted a similar system in his own practices by networking his computer terminals. During a consultation he needs only to flick between screens to get a full summary of the patient's situation.

He is surprised by the extent to which being therapeutically endorsed has influenced the way his practices operate, particularly with the increase of red-eye patients.

'I assumed that I'd get the same number of red eye cases that I have always seen in the past 20 years but since I have been endorsed an increase in patient and GP referrals has meant that red-eye cases have risen sharply.'

Triage procedures are in place to make allowances for the urgent nature of red-eye patients. McMahon has trained his reception staff to ask the right questions so they can determine which patients need to be attended to immediately. Merely leaving gaps in the appointment book may not always suffice. Support staff members in McMahon's practice know how to create gaps between patient appointments by targeting those patients who are not listed with complex symptoms.

'My staff members are also aware of the signs to look for in patients who may be contagious,' McMahon said.

'By making sure that everything in our practice is and remains sterile both before and after a patient leaves, we protect staff and other patients from infection. Instruments are swabbed with alcohol according to the professional guidelines. Everyone has to be involved in the sterilisation procedures. It's a team responsibility that cannot be delegated to a single person.

'The day you think that you have got nothing left to learn is the day you should give it away. The essence of maintaining interest in anything you do is by doing and learning new things and creating new challenges for yourself.'

Trypan blue

an essential component of modern

Dark staining of the capsule contrasts against the white or brown of the underlying cataract

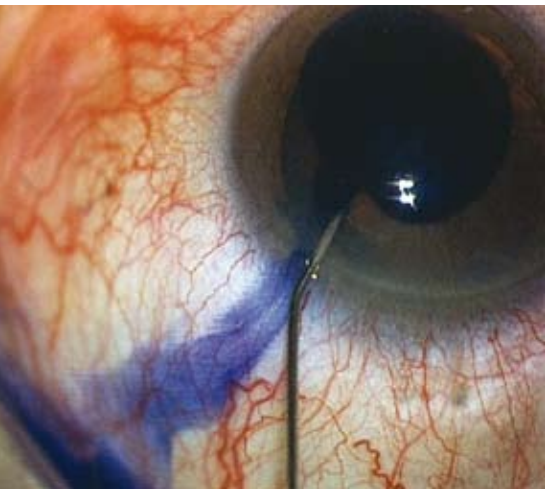

Figure 1. Introducing Trypan blue

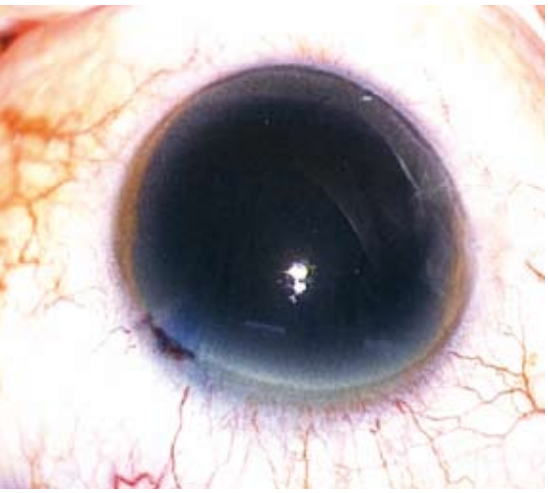

Figure 2. Anterior chamber full of Trypan blue

A critical part of the phacoemulsification procedure involves puncturing the anterior capsule and then 'tearing' it to create a round opening through which the operation is performed. This part of the procedure is referred to as a continuous curvilinear capsulorhexis or simply the 'rhexis'. The word is derived from Greek and means 'to tear'.

This step of the procedure is made possible by the red reflex which allows the edge of the tear to be seen. If there is no red reflex or only a weak reflex, such as occurs in brunescent or white cataract, the edge of the tear cannot be seen. This can result in the tear extending to the periphery and even posteriorly to involve the posterior capsule. Continuation of surgery under these circumstances can result in vitreous prolapse or, even worse, dropping the lens into the vitreous. Thus, this is a critical step on which is determined the success or failure of the procedure.

This aspect of surgery can be made much safer by staining the anterior capsule with a dye.

The use of dyes dates back to 1998 when fluorescein was used to stain the capsule. Fluorescein is a low molecular weight substance and consequently it did not remain confined to the anterior chamber, finding its way to the lens and vitreous.

In the same year Indocyanine green was also tried with less than satisfactory results due to difficulties dissolving the dye in solution. Other dyes that have also been tried include crystal violet, gentian violet and Brilliant Blue G. It was not until the advent of Trypan blue in 1999 with its superior staining abilities that this technique became mainstream.

What is Trypan blue?

Trypan blue is a vital dye derived from toluidine. It was first synthesised by Paul Ehrlich in 1904. Light microscopy of the frozen sections of eyes stained with Trypan blue demonstrate accumulation of the dye in the basement membrane of the lens capsule, with staining being concentrated in the portion of the basement membrane adjacent to the lens epithelial layer. The epithelial layer does not appear to stain.

How is Trypan blue used in cataract surgery?

The technique of using Trypan blue has been described by many authors. Most involve introducing it under air or under a protective layer of viscoelastic, the rationale being that this protects the endothelium and other structures from also being stained. In fact, this is not the case as was demonstrated in a paper by myself and Coroneo. Our technique involved direct introduction of Trypan blue into the anterior chamber and subsequently washing it out with viscoelastic. No air or viscoelastic is necessary and no additional structures are stained. This technique is much quicker and cheaper, as fewer materials are used.

cataract surgery

Joseph San Laureano
BSc MBBS MMed FRANZCO
Melbourne Eye Centre,
Epworth Hospital

When is Trypan blue used in cataract surgery?

Use of Trypan blue has become an essential component of modern cataract surgery. It is most commonly used to enhance the visualisation of the anterior capsulorhexis, a critical manoeuvre of the phacoemulsification procedure, but is also used to assist the performance of a posterior capsulorhexis. The dark staining of the capsule contrasts against the white or brown of the underlying cataract. The dye is rapidly removed from the eye and even on the first post-operative day there is usually no dye to be seen.

Anterior capsulorhexis

The use of Trypan blue to visualise the capsulorhexis can markedly improve the success and safety of an anterior capsulorhexis in the setting of a:

- brunescent or white cataract
- small pupil due to pseudoexfoliation, diabetes or chronic use of miotics such as pilocarpine
- corneal opacity
- capsulorhexis that has run out to the periphery.

Paediatric cataract surgery and surgery in patients with chronic uveitis

A key difference between adult cataract surgery and paediatric cataract surgery is the inevitable posterior capsular opacification that results. For this reason a posterior capsulorhexis is always performed with 'optic capture'. This manoeuvre can be challenging. Here Trypan blue is used to stain the posterior capsule. The underlying vitreous face contrasts with the stained capsule, making the rhexis easier to perform. Similarly, patients with a history of chronic uveitis have a much higher chance of posterior capsular opacification and benefit from a posterior capsulorhexis.

Posterior capsular tear

If a posterior capsular tear with vitreous prolapse occurs during surgery, then an anterior vitrectomy is required. This is often difficult as the prolapsed vitreous is difficult to visualise. Several techniques have been described to facilitate visualisation, including the use of intracameral triamcinalone, but this is difficult and time-consuming as it involves tedious filtering and washing of the triamcinalone. Trypan blue introduced into the anterior chamber will selectively stain the vitreous and facilitate the vitrectomy. It does not require filtering or washing and, unlike triamcinalone, is more readily available in most operating theatres.

Are there possible adverse effects of Trypan blue?

Trypan blue has been shown to be safe to use and is well-established in modern cataract surgery. There have been case reports of adverse effects related to infection and cystoid macular oedema with its use, although none has been clearly established as being causally related to the use of Trypan blue.

Continued page 14

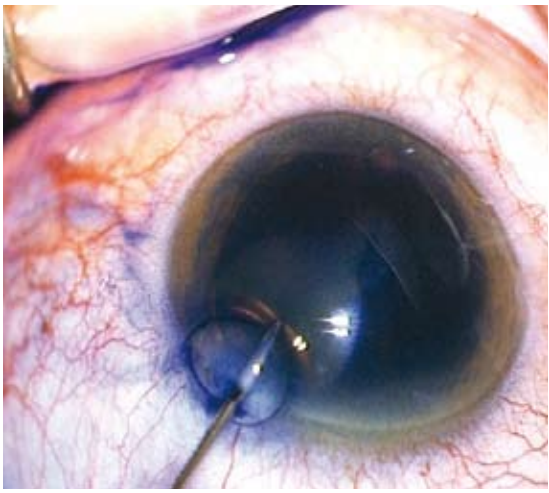

Figure 3. Injecting viscoelastic

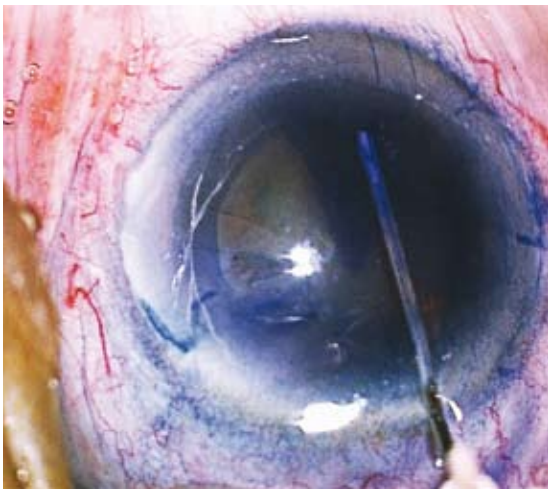

Figure 4. Starting the rhexis

Trypan blue

From page 13

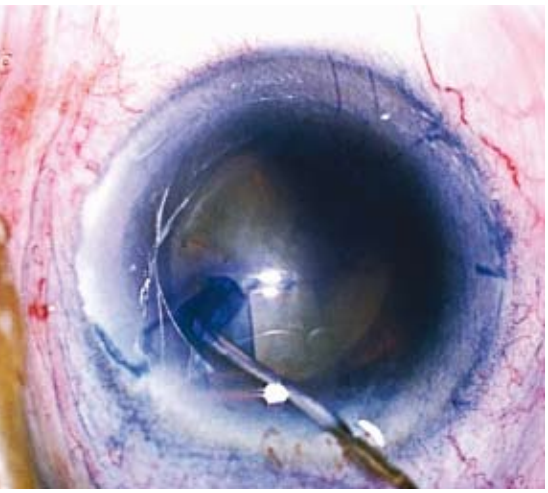

Figure 5. Complete capsulorhexis

What are the other ophthalmic uses of Trypan blue?

- **Trabeculectomy**

It is common to use antimetabolites such as 5-flurouracyl or mitomycin C during trabeculectomy, to reduce the risk of bleb failure secondary to the healing response. Due to their toxicity it is necessary to limit the area of exposure to the conjunctiva and the sclera to minimise these complications. These antimetabolites are clear in appearance and so the area of contact cannot be seen. A recent publication has described mixing these antimetabolites with Trypan blue to determine their area of contact.

- **Overfiltering blebs**

An over-filtering bleb in a patient with glaucoma can be a difficult management problem. Numerous techniques exist to deal with this problem, most of which involve the patient returning to the operating theatre. Recently a technique has been described in which the over-filtering bleb is painted with Trypan blue and then a neodymium YAG green laser is applied to the bleb. The dye selectively absorbs the green laser light and results in localised contraction burns, shrinking the bleb

- **Pterygium surgery**

Modern pterygium surgery involves performing an autoconjunctival graft to reduce recurrence rates. Sometimes during surgery the orientation of the graft can be confused, risking the graft being applied 'upside down'. Trypan blue can be applied to the graft to distinguish the appropriate surfaces, as it selectively stains the Tenon's side of the graft without staining of the conjunctival surface.

- **Trypan blue assisted posterior tenectomy of the superior oblique**

Performing a posterior tenectomy can be a difficult procedure as the anatomic structures are difficult to visualise. Trypan blue can be used to stain the superior oblique tendon for easy identification and delineation of it at its insertion, making the current surgical technique less difficult.

- **Enucleation surgery**

During enucleation surgery, closure in layers is important to decrease the risk of exposure of the prosthetic implant. Thus, posterior Tenon capsule, anterior Tenon capsule and the conjunctiva are closed separately. Discerning between conjunctiva and anterior Tenon is challenging; Trypan blue can be used to distinguish between anterior Tenon capsule, which it stains, and the conjuctiva, which it does not.

- **Chromovitrectomy**

Trypan blue has been shown to stain both the retinal internal limiting membrane and epiretinal membranes. Other dyes such as indocyanine green and, more recently, infracyanine green have also been used when peeling epiretinal membranes. Unlike these dyes that selectively stain the acellular inner limiting membrane but not overlying membranes and vitreous, Trypan blue directly stains epiretinal membranes.

Indocyanine green is referred to as a negative stain as it can indicate the presence of the epiretinal membrane only by its lack of green staining within an area of stained inner limiting membrane. Trypan blue has an affinity for the cellular material composing these membranes and results in direct visualisation.

When should your patient be referred for Trypan blue with cataract surgery?

Patients who have white or brunescent cataracts are ideal candidates for Trypan blue. Patients who are diabetic, have pseudoexfoliation or have used miotic agents chronically and are likely to dilate poorly are also likely to benefit from Trypan blue. Patients with corneal scarring or dystrophy will be more difficult surgical candidates whose surgery will be made much easier with Trypan blue intraoperatively.

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Peer support

Peer support networks enable optometrists to turn to their colleagues for advice. **Matt Trollope** reports.

Optometrists who become therapeutically endorsed experience new challenges with interesting presentations, and peer support networks can be a helpful resource for them.

These networks are common in many health professions. The groups usually form online, either through an email list or a forum in which people can post messages on an online 'board'. Groups may meet over dinner, or a group of younger and less experienced optometrists may approach a mentor.

Paul Brand thought his fellow graduates should support each other with professional advice after graduating from Queensland University of Technology's inaugural Graduate Certificate in Ocular Therapeutics course in 2005.

'A few of us were chatting at the graduation ceremony and we suggested having some sort of way of communicating with each other to help with different problems we might face dealing with therapeutic cases,' he said.

Brand, who practises at Birtinya on the Sunshine Coast, added all therapeutically-qualified optometrists in the state to a group email list through Google. With about 45 currently in the group, Brand has found it to be very useful.

'Group members might ask clinical questions about a case, or the suitability of certain medications,' he said. 'It's for problem solving, the same as you might ring up a colleague and ask a question, except this way you've got lots of people listening at once. You can pose a question between consultations and usually get quick feedback.'

Therapeutically-qualified Queensland optometrists are not the only ones making use of peer support networks. While Brand's group has a specific membership base, optometrists all over Australia can join the AusOptom list.

This group was the brainchild of optometrist Dr Phil Anderton and optometrist-turned-software engineer Grant Sayer. It was established with the help of the association's New South Wales Division, which funded the purchase of a server in 1993.

Optometrists can join the list simply by emailing Dr Anderton (pjanderton@optusnet.com.au) and asking him to add them to it. There are currently about 300 members.

'It is particularly useful for people who are working in rural areas on their own,' Dr Anderton said.

> **It's for problem solving, the same as you might ring up a colleague and ask a question, except this way you've got lots of people listening at once.**

Paul Brand

AusOptom members discuss professional topics ranging from clinical cases to product information. They can seek information on particular products from representatives at Essilor and Designs For Vision, who are guest members of the list.

AusOptom is useful for optometrists seeking therapeutic guidance. With Brand's list generally restricted to Queensland members, therapeutically-trained optometrists in other states can benefit from peer support in their field by joining AusOptom.

Dr Anderton says there is no direct competition between the two lists, with everybody in the profession looking to help each other.

Groups that meet in person are rare. Brand says that when his group was first established, dinners were arranged in which a Novartis representative would present the company's latest drugs to attendees and some members would provide a case report of a patient's visit. These dinners stopped because many of the group's members were constrained by time, distance and other commitments. Their interaction now occurs solely online.

While face-to-face discussion of professional matters is most effective, online networks are adequate in providing optometrists with the guidance and advice they seek.

Shirley Loh, the Optometrists Association's national professional services manager, says Dr Anderton's forum is equally useful for new graduates and experienced optometrists.

'One of the most valuable things the list offers is a different view on a range of optometry issues,' she said. 'It is also a great way to stay connected with others in the profession, especially as a lot of optometrists work by themselves.'

Loh is undertaking the Postgraduate Certificate in Ocular Therapeutics at The University of Melbourne and says the AusOptom list will help her prepare for her work as a therapeutically-endorsed optometrist.

'Even though I am not therapeutically qualified yet, I have put aside a number of email posts about what to do and what not to do when prescribing. They might come in handy next year.'

Plaquenil treatment

What screening should optometrists perform?

Erica Fletcher
Department of Anatomy and Cell Biology
The University of Melbourne

The benefits of using the antimalarial drugs chloroquine and hydroxychloroquine (Plaquenil) for treatment of rheumatoid arthritis, systemic lupus erythematosus and other connective tissue and skin disorders are well established.

Although hydrochloroquine has largely replaced chloroquine because of its reduced retinal toxicity, both drugs can cause irreversible retinal degeneration that may even progress after cessation of drug treatment. The potential permanence and severity of hydroxychloroquine toxicity make it vital that optometrists screen patients to minimise its occurrence.

Although the detailed mechanism of hydroxychloroquine toxicity is not well understood, it is generally viewed that hydrochloroquine binds to melanin within the retinal pigment epithelium (RPE) to cause retinal dysfunction. Hydroxychloroquine toxicity is very rare with a reported incidence of between 0.5 to 3.4 per cent of patients taking the drug.[1] In the 400 patients followed for 15 years by Mavrikakis et al,[1] only two people developed irreversible toxicity.

Early retinopathy is defined as an acquired paracentral scotoma on threshold visual field testing without any fundus changes. In contrast, advanced hydroxychloroquine retinopathy is characterised by an acquired paracentral scotoma with associated parafoveal changes in the retinal pigment epithelium.

The RPE changes may range from early RPE stippling, to the classic bull's eye ring of hypopigmentation (Figure 1). In very advanced cases arteriolar constriction and optic atrophy may also occur. In addition to retinal changes, chloroquine and to a lesser extent, hydroxychloroquine can cause whorl-like intraepithelial deposits within the cornea.

In determining the screening frequency and protocol to use, it is important to consider whether patients are at low or high risk. The key risk factors for development of toxicity are shown in Table 1 and include dosage, duration of drug treatment, age of the patient and whether retinal, renal or liver disease is present.

This is because toxicity to hydroxychloroquine is theoretically more likely to occur in patients where drug clearance from the body is slowed. The great majority of reports of hydroxychloroquine toxicity have occurred in people taking more than 6.5 mg/kg/day for more than five years. The few cases of hydroxychlorine toxicity in patients taking lower doses were associated with long-term usage (longer than five years).

It should be noted that toxicity can develop rapidly especially if high doses of hydroxychloroquine are used, for example, treatment to prevent graft rejection. Moreover, reports in the older literature suggest that the cumulative dose of hydroxychloroquine may be an important predictor of those more likely to develop eye signs.

In assessing a patient's risk of toxicity, it is worth considering how hydroxychloroquine is prescribed. Hydroxychloroquine is typically prescribed in tablet form in a dose of 200 or 400 mg/day. In a person younger than 60 years of age, a 200 mg daily dose will be relatively safe (at least for five years) for all except the very light or small individuals (safe for all those weighing less than 31 kilograms and of average build). However, a 400 mg daily dose could be problematic for all those weighing less than 62 kilograms.

The manufacturer of hydroxychloroquine

	Low risk	Screening	High risk	Screening
Dosage	<6.5mg/kg		>6.5mg/kg	
Duration of use	<5 years	Baseline, then	>5 years	Baseline, then
habitus	Leave or average fat	review every	high fat level	yearly review
Renal / liver disease	none	2-3 years	present	
Retinal disease	none		present	
Age	<60 years		<60 years	

Table 1

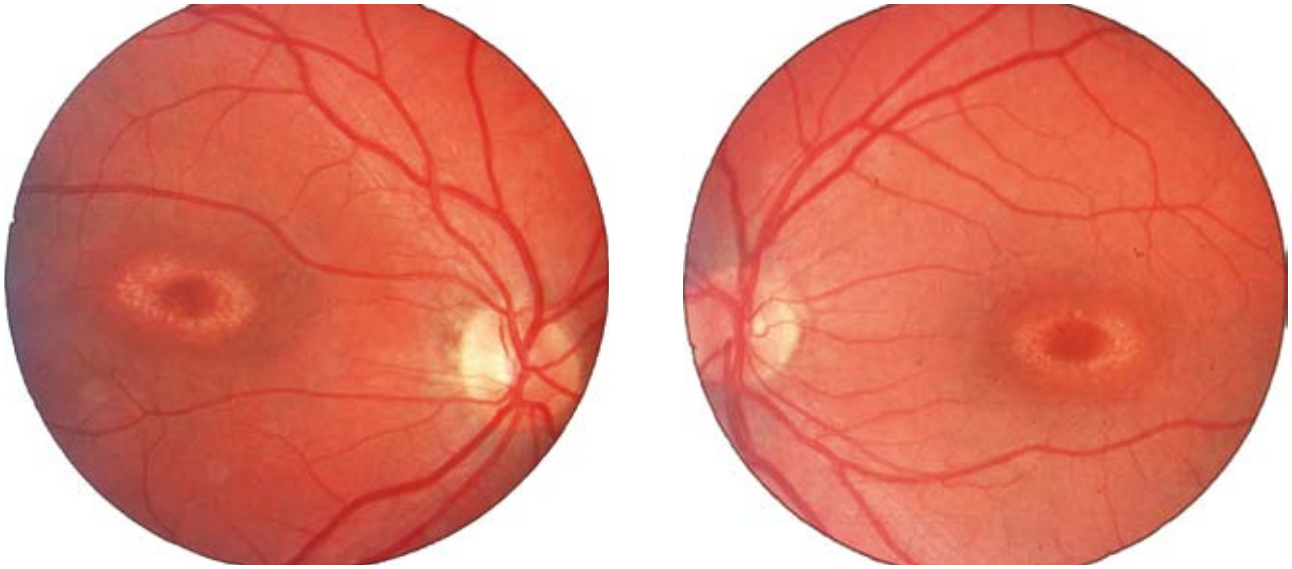

Figure 1. Bull's eye retinopathy in the right and left eyes of a patient receiving long-term chloroquine therapy; note the ring of hypopigmentation of the RPE around the macula (Reproduced with permission from Weisinger et al,[4] Figures 4 and 5)

(Plaquenil) recommends ophthalmologic examination every three months. A recent survey of rheumatologists indicated that 94 per cent screen their patients annually because they were unwilling to accept any risk of visual damage.

In view of the rarity of the condition, the American Academy of Ophthalmology recommends that all patients taking hydroxychloroquine have a base line ocular examination within the first year of taking the drug (Marmor et al 2002). Follow-up for patients at low risk should be no more frequent than for anyone of the same age (about every two to three years). For patients of high risk it is recommended that annual screening is performed.

The testing regime should include:

- distance visual acuity
- colour vision (for example, Farnsworth D15, or L'Anthony's Desaturated D15)
- automated perimetry (threshold testing)
- corneal biomicroscopy
- dilated fundus examination (with fundus photography if available).

Those at high risk should also be instructed on the use of an Amsler grid and encouraged to return sooner if visual symptoms develop. Ocular coherence tomography and electrodiagnosis (using multifocal ERG) have also been shown to be very sensitive in detecting early retinal changes.[2,3]

If visual symptoms develop, or early signs of toxicity become apparent, referral back to a patient's rheumatologist is warranted. Because hydroxychloroquine is cleared slowly from the body, patients should be followed carefully for possible worsening of visual signs and symptoms.

Hydroxychloroquine can cause very significant loss of vision in rare cases. Optometrists are well placed to screen all patients for possible toxicity. They should first assess a person's risk of developing toxicity and then use sensitive methods to screen all patients.

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Abstracts

Andrew Hogan
BScOptom

Thickness does matter

Central corneal thickness may not just affect measured IOP but may influence the IOP-lowering agent of choice in some patients.

A study aimed to determine the effect of corneal thickness on the effectiveness of various glaucoma drugs. Patients with diagnosed ocular hypertension and those with normal IOP were divided into Thick Cornea (>540 micron) and Thin Cornea (≤540 micron) groups. After one week of treatment with various IOP-lowering drugs, pressure was significantly lower in the hypertensive Thin Cornea group, by slightly over 1 mmHg.

Interestingly, the final IOP was significantly lower in the Thin Cornea group treated with brimonidine, but not with latanoprost. Better pack that pachymeter ...

Johnson TV, Toris CB, Fan S, Camras CB. Effects of central corneal thickness on the efficacy of topical ocular hypotensive medications. *J Glaucoma* 2008; 17: 2: 89-99.

Technique matters too

Conflicting reports published on the mechanism of action of the prostaglandin analogs bimatoprost, latanoprost and travoprost may be due to the method of measurement.

A study looked at the aqueous outflow dynamics using different techniques. Not surprisingly, all three medications were found to reduce IOP but the mechanism of action appeared to vary, depending on the method of measurement.

Outflow facility appeared to increase when measured by Schiotz and two-minute pneumatonography, but not when measured by fluorophotometry or four-minute pneumatonography. Uveoscleral outflow appeared to increase when measured by four-minute pneumatonography and fluorophotometry, but not by two-minute pneumatonography.

The fact that these results differed even when measured on the same patient suggests that confusion about the mechanism of action of these drugs was caused by the various measuring techniques, and not actual changes in how the drugs work. Once more, it proves that technique really does matter.

Lim KS, Nau CB, O'Byrne MM, Hodge DO, Toris CB, McLaren JW, Johnson DH. Mechanism of action of bimatoprost, latanoprost, and travoprost in healthy subjects. A crossover study. *Ophthalmology* 2008 May; 115: 5: 790-795.e4.

Wrong way to do it?

A quick but detailed summary of the correct method of using eye-drops takes a twist with some very interesting points.

The question of one drop or two is vexed; as this article points out, using two drops doubles the cost of medication and increases the likelihood of spillage causing a contact allergy. It is unlikely to increase effectiveness.

The issue of when to discard eye-drops is also discussed. We generally recommend that eye-drops should be discarded 28 days after opening. The author suggests that this advice is based on 'the olden days' when drops were dispensed in glass bottles with pipettes, many drops did not contain preservatives, and beer still came in steel cans. Perhaps more research in this area is needed.

Finally, the author discusses correct techniques for instilling eye-drops to ensure that at least some of the drop ends up in the eye.

Steiner M. On the correct use of eye drops. *Aust Prescriber* 2008; 31: 16-17.

In the fridge

Significantly higher levels of thermal breakdown product have been found in samples of generic chloramphenicol stored on the shelf at room temperature.

Researchers were sent to various retail pharmacy outlets in Delhi and Chennai in India to purchase bottles of generic chloramphenicol. The conditions the drops were stored under were recorded and then the concentrations of hydrolytic degradation products were measured to assess their condition. The authors found that storage at room temperature undermines product reliability, contributes to the positive selection of resistant bacteria and produces toxicity effects.

The study is interesting for another reason: chloramphenicol is available over the counter, without prescription, in India. The study was prompted by the recent deregulation of chloramphenicol purchased over the counter in Europe.

Chloramphenicol is a strange drug—available on prescription in Australia and used extensively, available on prescription in the USA and nobody touches it, and available to everyone in India and Europe. The world is a funny place.

Aboshiha J, Weir R, Singh P, Ewings P, Lovering A. To what extent does a lack of refrigeration of generic chloramphenicol eye-drops used in India decrease their purity and what are the implications for Europe? *British J Ophthalmol* 2008; 92: 609-611; doi:10.1136/bjo.2006.106518.

Important to be Smart

It seems that the new SmartPlug is no better than regular punctal plugs at treating dry eye.

Optometrists treating dry eye routinely use the technique of punctal occlusion to retain tears at the ocular surface and reduce the reliance on topical lubricant drops. This study compared the clinical efficacy, retention rates and complications of regular silicone plugs with the newer SmartPlug, the heat sensitive punctal plug that expands to fill the available space, and allegedly, cannot be rubbed out. After following up for 11 weeks, both types of plugs showed significant reduction in both symptoms and corneal staining. The difference between the two plug types was not statistically significant.

SmartPlugs did show a significant improvement in tear meniscus height. Complication rate was similar between the two groups. Overall, both plug types reduced the dependency on tear supplements in more than 55 per cent of dry eye patients. If you prefer your meniscus to be high, consider SmartPlugs; otherwise, it might not matter.

Burgess PI, Koay P, Clark P. SmartPlug versus silicone punctal plug therapy for dry eye: a prospective randomized trial. *Cornea* 2008; 27: 4: 391-394.

Germs love antibiotics

Researchers have isolated hundreds of soil bacteria with the ability to grow on antibiotics. Of the 18 antibiotics tested, up to 17 of them supported the growth of the bacteria. Apart from being quite pleased with themselves, the antibiotic-loving bacteria were a diverse group and closely related to human pathogens. Not surprisingly, many of them were resistant to clinically relevant concentrations of more than one antibiotic. Have antibiotic resistant bacteria just got smarter?

Dantas G, Sommer MOA, Oluwasegun RD, Church GM. Bacteria subsisting on antibiotics. *Science* 2008; 320: 5872: 100-103.

.. and are smart

Commonly isolated bacteria have been shown to develop resistance to high-end antibiotics within a 10-month period.

This study looked at the resistance patterns and antibiotic sensitivity of bacterial keratitis to the drugs ciprofloxacin, cefazolin and gentamicin. All cases of bacterial keratitis referred to a particular microbiology lab from two consecutive 10-month periods were reviewed.

Of all the bacteria containing cultures, 87.5 per cent were gram-positive and 12.5 per cent were gram-negative. The most common bacteria isolated was coagulase-negative *Staphylococcus* (45.5 per cent) followed by *S. aureus* (15.2 per cent). The resistance pattern for gram-positive bacteria increased for ciprofloxacin and cefazolin, but not for gentamicin. The resistance pattern for gram-negative bacteria did not change significantly for any of the drugs.

Statistically significant increases in bacterial resistance for two drugs as commonly used as ciprofloxacin and cefazolin emphasise the need for close follow-up after the initial empirical treatment. It seems like 10 months is a long time for germs.

Afshari NA, Ma JJK, Duncan SM, Pineda R, Starr CE, DeCroos FC, Johnson CS, Adelman RA. Trends in resistance to ciprofloxacin, cefazolin, and gentamicin in the treatment of bacterial keratitis. *J Ocul Pharmacol Ther* 2008; 24: 2: 217-223.

Pharmacists join dry eye training sessions

A second series on allergies is scheduled for later this year

Pharmacists and optometrists have come together in Sydney, Adelaide and Hobart for lectures on dry eye.

The 'Managing Dry Eye' sessions, sponsored by Alcon, were first held in late 2007. They were conceived as a way to forge closer links between the two professions, with optometrists and pharmacists sitting at the same tables according to their geographic location.

More sessions are scheduled in Melbourne, Brisbane, Perth and Toowoomba in June and July.

Over dinner, an optometrist who specialises in dry eye presents a lecture, which is followed by a question and answer session. The participants are given lecture notes and can complete evaluation forms outlining their thoughts on the session. Good suggestions are adopted for future sessions.

Sydney-based optometrist Allan Ared has been delivering the lectures at the sessions. He says they are necessary to increase both groups' understanding of the condition.

'In the past, dry eye treatment has been a hit and miss event,' he said.

'Diagnosing the condition was difficult and both pharmacists and optometrists were led to believe that all dry eye products were created equal, but that is not the case. Because dry eye is extremely common, it is important for both pharmacists and optometrists to understand the concepts and principles that govern this condition.'

The sessions are particularly helpful for pharmacists, who see many ocular patients but do not have the optometrists' depth of understanding of the condition and cannot diagnose it as accurately. To bridge this gap, Ared says he relies heavily on the evaluation forms so that both groups' concerns and queries are met.

'My presentations are a work in progress, because it is hard to address two different professions with the same presentation,' he said. 'I tailor my question and answer sessions to make sure I am addressing what pharmacists and optometrists want to know.'

CPD points are attached to the sessions for both professions.

Optometrists Association national marking manager Robert Hilkes says the concept has been so well received by optometrists and pharmacists that each session is overbooked. 'Over 90 per cent of participants when surveyed said they would recommend the talks to a colleague,' he said.

'Attendees get to meet another healthcare professional from their region, they learn a great deal and they ask many varied and sometimes complex questions. Both groups see the sessions as worthwhile CPD, as well as a good networking opportunity.'

This success has led to the development of a new group of sessions with a focus on ocular allergies. They are scheduled for September and October in Melbourne, Brisbane, Hobart and Launceston and will follow a similar format to the dry eye events.

OPTOMETRISTS
ASSOCIATION AUSTRALIA

Alcon®

Pharmacology of pterygium management

Lawrence Hirst
MBBS MD MPH DO
CEO Queensland Eye Institute

Symptomatic relief

The principal symptoms that patients with pterygium complain of, and which may be treated for temporary relief, are redness and the cosmetic effect, and irritation.

- **Redness and the cosmetic effect**

Over-the-counter vasoconstrictors will frequently relieve the obvious redness within minutes but the effect is usually of short duration, about four to six hours. This means that many people will use 2-4 drops a day to try to keep their eyes constantly as white as possible.

One way of demonstrating to the patient in the office the effect of vasoconstriction is to instil one drop of 2.5% phenylephrine, which will elicit a rapid blanching. This is useful for very introspective or demanding patients as they have to be aware of the cosmetic effect that blanching will have, and what it cannot do–it cannot change the appearance of the gathering of conjunctiva and encroachment onto the cornea et cetera.

I warn patients that the use of vasoconstrictors should be limited. The exact number of drops that can be used over a period is very variable. I explain that if they use these 3-4 times a day for 2-3 days every month or so, they are unlikely to encounter problems. However, if they use it 2-3 times a day for months they will end up 'chasing their tails' with reactive hyperaemia of the whole eye, which requires them to go 'cold turkey' and wait for this to settle. If the occasional use does not suffice, it may be an indication for pterygium removal.

Most vasoconstrictors will work equally well, although occasionally some patients find one superior to another.

Topical non-steroidal anti-inflammatory agents, such as indomethacin, and topical steroids, have been trialled with varying success.[1]

- **Irritation**

Usually this is best relieved by the use of non-preserved tear substitutes as required. I prefer these to preserved tear substitutes because of the need for chronic use and the likely end result of preservative toxicity in many patients, especially the elderly, or those with concomitant ocular surface problems such as dry eye or rosacea.

Again, steroids such as FML or flarex may be used occasionally for short-term use when symptoms are more intense and there is significant inflammation. It is important to caution patients that these medications cannot be used regularly or without supervision.[1]

Pre-operative

The only drug that has been tested as a preparation for subsequent surgery is subptergyium injection of mitomycin.[2] There is soft evidence that this may reduce the risk of subsequent recurrence.

Intra-operative

Mitomycin has been commonly used during surgery in an endeavour to reduce recurrences,[3] in a variety of concentrations and duration of application.

It appears that it does work but brings with it the risk of serious complications

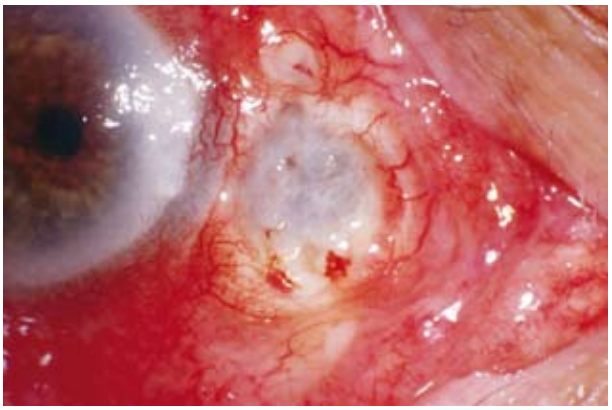


Figure 1. Full thickness scleral ulcer six weeks after intraoperative mitomycin

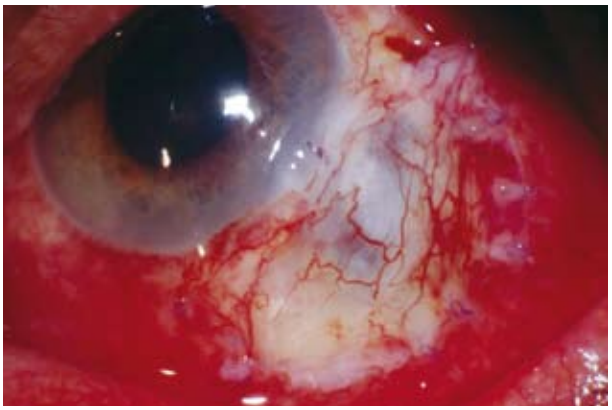
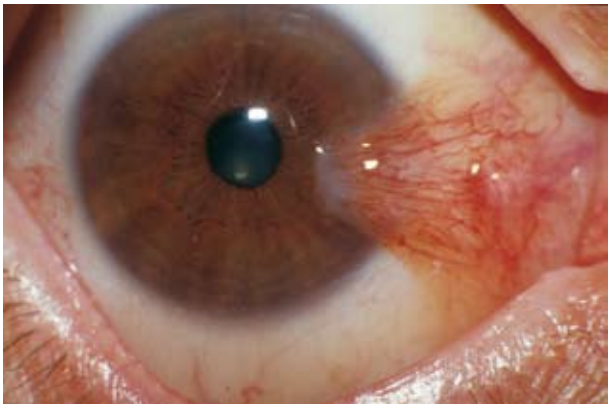
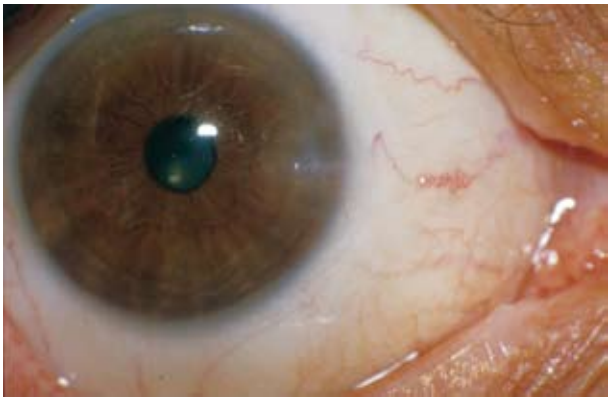


Figure 2. Acute scleritis covered by conjunctival graft three weeks after intraoperative mitomycin





Figures 3A and 3B. Before and one year after P.E.R.F.E.C.T. for Pterygium

such as scleral necrosis and acute scleritis,[4] both of which can threaten vision (Figures 1 and 2).

5 Fluorouracil[5] and daunorubicin[6] have also been used intra-operatively with less convincing effect on recurrence rates but also fewer complications.

Thiotepa[7] was the first cytotoxic agent used in pterygium surgery but is now no longer available.

Post-operative

Post-operative mitomycin drops in a variety of concentrations[8] have been used to reduce recurrence but are also associated with significant complications as discussed above and can result in loss of all vision in occasional cases.

For impending recurrences, injected steroids and fluorouracil[9] have also been investigated.

Finally, antibiotics and steroids in a variety of combinations, doses and duration are commonly used, usually an antibiotic such as chloramphenicol four times a day for 1-3 weeks and a steroid such as Flarex or Maxidex four times a day for 1-3 weeks.

Cytotoxic drugs

Mitomycin in particular and 5 FU to a lesser extent have been used widely in the surgery for glaucoma, a potentially blinding disease, to increase the likelihood of establishing a lower post-operative pressure. They have been shown to be highly effective in this role. Serious questions could be raised as the concomitant risk of complications, which include loss of all vision from these drugs, is not warranted for the treatment of a condition such as pterygium, which is rarely blinding.[10] This is especially so when alternative surgeries that do not use these drugs may result in equal, if not better, results and few, if any, serious sight-threatening complications.

Conjunctival autografts, which have been in use since the 1970s and were brought to prominence in the 1980s,[11] have been the gold standard by which most other pterygium treatments are measured.

More recently, a major modification of this technique known as P.E.R.F.E.C.T. (Pterygium Extended Removal Followed by Extended Conjunctival Transplant) for Pterygium has extended the efficacy and cosmesis of conjunctival autografts with very low recurrence rates (1/250 for primary pterygia), low complication rates and excellent cosmesis[12] (Figures 3A and 3B).

Even the much publicised use of amniotic membrane for pterygium excision has as part of its methodology the concomitant use of mitomycin.[13]

The only possible rationale for the use of these cytotoxic agents in pterygium surgery would appear to be brevity of surgery, simplicity of surgery and relative efficacy.

You might ask yourself whether for *your* pterygium removal, the duration of the surgery and the ease with which the surgeon performs the surgery are the crucial factors determining your choice of surgeon and method. Would you prefer to concentrate on the safety of the method, the best cosmetic appearance and the lowest recurrence rate?

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Boston is at the leading edge of telemedicine, says **Tony Cavallerano**, director of a veterans affairs program and Professor of Optometry at the New England College of Optometry

Letter from the USA

I have spent the past 10 years of my career involved in technology-based eye-care projects, the past five with the Department of Veterans Affairs (VA). My involvement with telemedicine and the application of technology in delivering health care began during the time that the Victorian optometrists were travelling to Boston to complete the clinical component of their therapeutics training.

I have always admired the spirit and the drive of the Aussies, and I have to say that I was very impressed by their experience and their commitment to complete the clinical requirements of the program to expand their ability to treat eye disease.

Being the first in Australia to gain the credentials and expanded scope of practice in the use of therapeutic agents was an accomplishment to be admired.

At my facility, the VA Boston Health Care System, we are heavily steeped in technol-

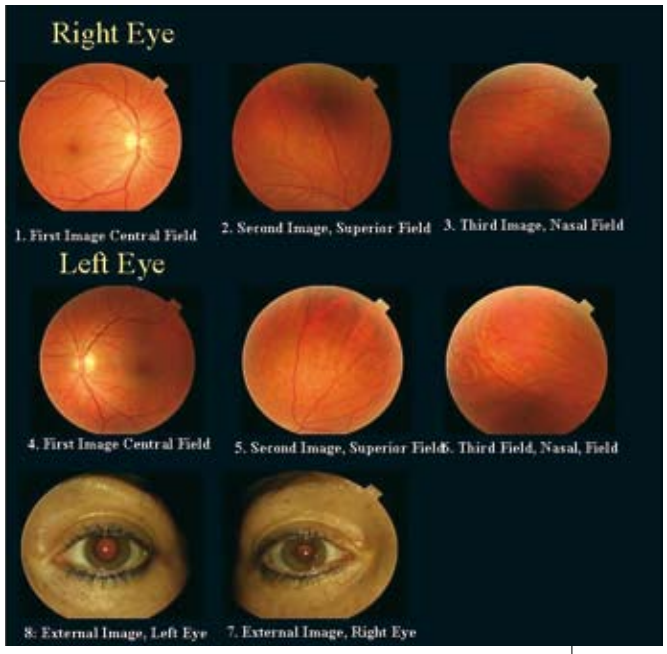


Figure 1

ogy and have been caught up in telemedicine research. Convened more than five years ago, the VA Boston Ocular Telehealth Center has been a national leader in the application of technology as a tool for eye and health care delivery and we have immersed ourselves in research involving telemedicine and teleretinal imaging.

The original premise of our telemedicine program was to validate non-mydriatic digital retinal imaging for diagnosing level of diabetic retinopathy. During the first full year of the program, we screened 110,000 patients with diabetes, with the goal of stratifying the patients into an eye-care program.

Patients are accessed for imaging when they present to ambulatory care or some service other than the eye clinic. For example, if they have an appointment in dentistry, primary care, with the social worker or diabetes nurse educator, or with any other ambulatory care service, we arrange for them to have non-mydriatic fundus images taken. We obtain eight images of the retina without dilation, and the images are evaluated by trained readers (Figure 1).

The reader's assessment provides a diagnosis of level of diabetic retinopathy and any other retinal signs of related systemic disorders. Given that one in five patients eligible for care in the VA has diabetes, we have provided an ophthalmic service that is sensitive enough to provide a high level of care for our patients.

As the average age of our patient is 64.5 years, we also identify other conditions that have increased age-related prevalence such as optic nerve signs of glaucoma or markers for age-related macular degeneration.

We have branched out to further develop a centre for ophthalmic imaging. In addition to digital retinal imaging with non-mydriatic fundus cameras, we have incorporated optical coherence tomography (time domain OCT and soon spectral domain OCT), scanning laser ophthalmoscopy (HRT) and the OPTOS Optomap 200.

Each of these devices affords a comprehensive yet unique method for posterior segment evaluation and assessment. Having these technologies available has enabled us to expand our teaching program for students and residents, and has allowed us to engage in clinical research.

Because each of these systems is DICOM compliant, we are now able to integrate the object image into our electronic medical record for viewing in our diagnostic display application.

The VA electronic medical record system is one of the most comprehensive and robust in the world. Serving more than five million patients, the system resides on a platform that allows the provider to obtain medical records, lab results and images from anywhere in the USA, regardless of where the patient seeks care within our system. The national nature of the application adds to continuity of care as well as comprehensive care.

An additional feature of the VA platform is an expanded self-care home Telehealth program. This program allows for the patient to participate in their own care by electronically submitting health information. For example, in the case of diabetes self-management, the patient transmits weight, glycosolated A1c and blood pressure readings, diet information and exercise activity.

The home Telehealth program is used for other chronic disease management as well, such as obstructive lung disease, asthma and cardiovascular disease. Telemedicine also plays a significant role in the remote management of mental health problems.

I offer a standing invitation to all Australian optometrists to come to Boston and visit our Ocular Telehealth Center. I would welcome the opportunity to spend time once again with a very distinguished group of clinicians and to share with them the excitement that has grown out of our program.

Therapeutics in a contact lens practice

Your chances of encountering minor ocular surface problems are higher when you prescribe contact lenses than when you prescribe spectacles

Luke Arundel
BAppSci(Optom)Hons
GradCertOcTher, FCLSA

The introduction of therapeutic prescribing in optometry has had a positive impact on our profession, particularly in the sub-section of contact lens practice. Essentially it gives us more options for patient management and expands the scope of care we can provide our contact lens wearers.

Why is it such a big deal?

When fitting contact lenses, we are putting a foreign body onto living tissue. This is an unnatural thing to do but as it is done so routinely, we do not think twice about it. Contact lens work gives us a greater chance of encountering minor ocular surface problems than when prescribing spectacles to a patient.

This is largely a probability issue and it has been shown that of the known risk factors for keratitis, contact lens wear has the dubious honour of occupying the number one spot. Keratitis may be just the tip of the complication iceberg as there is a whole range of conditions that are exclusive to contact lens wearers.

In addition to problems like giant papillary conjunctivitis (GPC) and contact lens acute red eye (CLARE), we also face having to deal with exacerbation of minor problems when contact lens wear is initiated. Contact lens wear has been described as a provocative test for dry eye and there are similar effects with sub-clinical allergy in spectacle wearers becoming more of an issue when using contacts.

If working with contact lenses means potentially seeing more problem eyes, we need to be in a position where we can manage them appropriately. Therapeutics is invaluable to the contact lens practitioner.

Advances in contact lens technology will be able to take us only so far; as the contact lens system comprises the contact lens plus the eye—which can be less than perfect physiologically. As contact lens technology improves, it is logical to also take our ocular surface management to the next level.

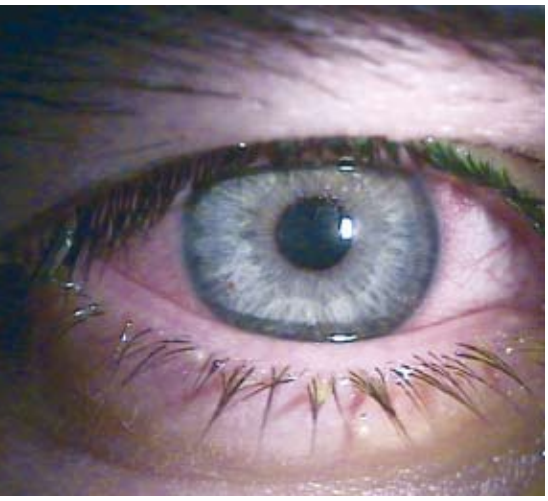
The use of therapeutics in contact lens practice can be divided into two separate areas.

The first is 'pre-fitting', which involves cleaning up the ocular surface prior to commencing contact lens wear. Managing blepharitis and allergy, particularly in keratoconic patients, is helpful because if we can improve the baseline condition of the eye, then we improve our chance of successful lens wear.

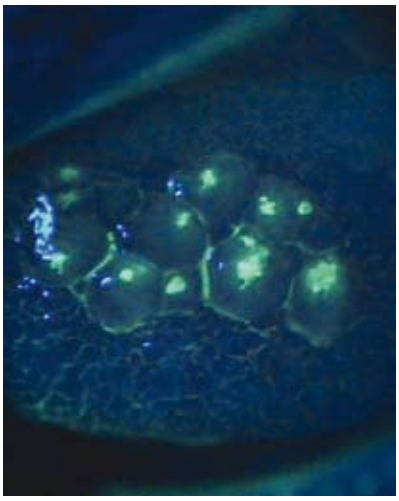
The second is 'post-fitting', in which the use of therapeutics enables immediate, accessible, cost-effective and timely management of contact lens complications. This last point is important as optometrists will often be the first point of call for any patient who has encountered a problem.

The most common conditions being managed therapeutically in our practice are GPC, CLPU, blepharitis, allergy, CLARE and prophylaxis following foreign body removal or trauma.

Having a more potent management arsenal has been fantastic for managing keratoconic patients presenting with GPC as the usual protocol of stopping contact



Contact lens acute red eye (CLARE)



Contact lens induced giant papillary conjunctivitis (GPC)

lens wear is not an option for many of these patients. A short course of steroids can be helpful in providing a faster return to comfortable lens wear when functional vision for driving and working is impossible without lenses.

Similarly, less potent steroids help resolve stubborn allergy that is unresponsive to treatment with antihistamines and mast cell stabilisers. Allergy control is again critical for keratoconic patients due to the link between vigorous eye-rubbing and progression of keratoconus. Interestingly, we have even observed regression in a few cases when effective control of allergy has stopped patients 'knuckling' their eyes.

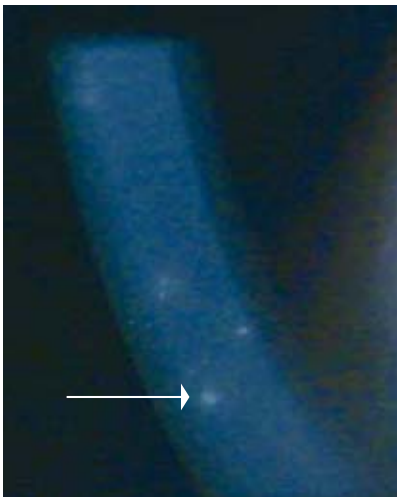
In CLPU, access to anti-infectives means optometrists can play a more active role in preventing the progression of suspicious lesions to anything more serious. Likewise, a covering antibiotic can be useful in CLARE, especially if a steroid is being considered to help control inflammation. A faster return to contact lens wear with therapeutics can be helpful for patients with out of date or even no spectacles and high prescriptions. In addition, patients are very appreciative of prompt management, especially when uncomfortable at presentation.

With blepharitis, therapeutics can be very handy for stubborn cases where lid hygiene alone is not effective. Finally, with antibiotic prophylaxis after foreign body removal or trauma, having access to therapeutic prescribing ensures timely prescribing rather than delaying treatment if the patient needs to additionally visit the GP.

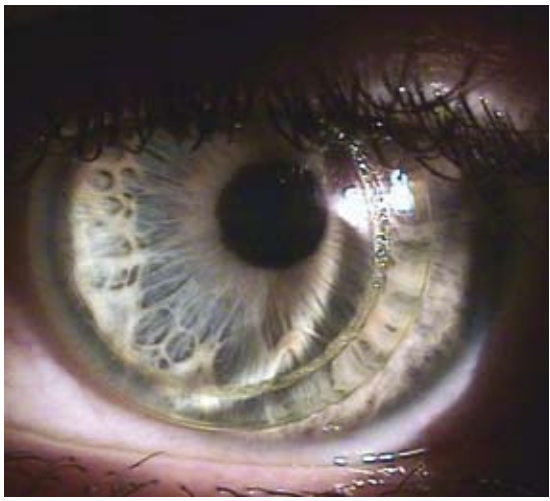
Personal and professional development is another benefit of the therapeutics course.

- Half of what we learned 10 years ago is now out of date.
- Expand, improve and consolidate knowledge base–therapeutics course is a handy way of reviewing changes since graduating from university.
- Better understanding of inflammation and infection process.

I have had a therapeutic endorsement for 18 months and have noticed that by far the biggest impact it has made is on *time*. It can provide prompt management of infection, accelerated management of minor contact lens complications and faster return to contact lens wear if required.



Corneal subepithelial infiltrates



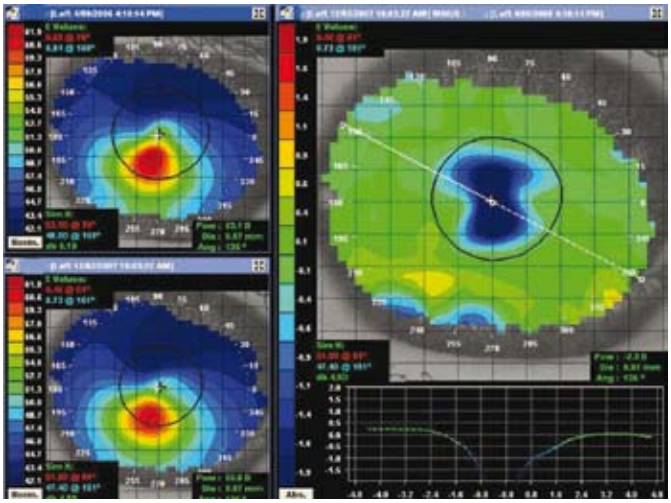
Protein coated lens

Advantages for patient

- Prompt action–our patients are told they will be seen *on that day* if they call to advise they have a red eye.
- Ease of accessibility means prompt management for patients.
- Slitlamp examination ensures more accurate diagnosis and *targeted* treatment, and prompt referral to ophthalmologist sub-specialist when required
- Improved convenience for patient when primary practitioner can manage minor complications.
- Reduced cost to patient for management of these conditions.

Advantages for practitioner

- Enhanced patient respect and confidence in practitioner if able to handle minor problems efficiently.
- Reduce drop-out rate of contact lens wearers through prompt treatment of minor complications (plenty of opportunity for re-education as monitoring management).
- Increased communication with patients.
- Existing patients often refer family and friends with red eyes to practice.
- Red eye walk-ins. Local GPs and pharmacists refer at least two red eye cases in each week. This is an easy way to add to your patient base
- Increased patient loyalty.
- More interesting than refraction.



Subtractive topography map: regression in keratoconus after allergy management and cessation of eye rubbing

Hydrogen peroxide comeback

Wendy Ho
MOptom

Lens care products (LCP) have always tried to achieve a balance between convenience, patient comfort, microbial efficacy, safety and unwanted side-effects on the lens and the eye.

Especially since the advent of the disposable lens and multipurpose solutions (MPS) era, the balance seems to have fallen in favour of convenience and comfort rather than safety and efficacy. In 2006-2007, the Fusarium and *Acanthamoeba keratitis* outbreak in Asia and the United States saw the global recall of MPSs and consequently, the necessary shift back to the fundamental purpose of LCP: antimicrobial efficacy with safety.

Hydrogen peroxide (H_2O_2) has been used as an antimicrobial agent for over 100 years. Since the introduction of hydrophilic contact lenses in the late 1960s, various methods have been used for contact lens disinfection. Hydrogen peroxide was one of the earliest disinfectants developed. It was originally developed in response to allergic and toxic reactions associated with other conventional chemical disinfection systems.

An inherent advantage of peroxide is that water and oxygen are its simple and safe by-products.[1] Today, it plays the same role in treating patients who suffer from solution sensitivity and provides excellent microbial efficacy and biocompatibility with new generation materials, namely silicone hydrogel lenses.

H_2O_2-based lens care systems are the only LCP that are preservative-free and, when neutralised properly, provide the ideal solution for patients who show hypersensitivity reactions. The dissociation of hydrogen peroxide yields oxygen and water, two inert and biocompatible chemical entities, so there are no residual chemicals to cause sensitivity or toxic reactions.

Stabilisers such as sodium stannate and

$$\underset{\text{hydrogen peroxide}}{H_2O_2} \rightarrow \underset{\text{free radical}}{[HOOH]} \rightarrow \underset{\text{water}}{H_2O} + \underset{\text{oxygen}}{O_2}$$

phosphonic acid are added to keep this reaction from occurring in the container. The free radical (see equation above) disrupts the cell wall membrane of many micro-organisms, causing cell death, and therefore has antimicrobial activity. Concentrations of 0.005 – 0.006% or 50-60 ppm (parts per million) are effective as a preservative, and concentrations of 0.6% (6,000 ppm) and 3%, or 30,000 ppm (3 grams of H_2O_2 per 100 ml of water) are available as effective disinfectants. Thus H_2O_2 is 'self preserving' and this is why H_2O_2-based lens care disinfecting solutions are often labelled as 'preservative-free'.

Hydrogen peroxide is a very effective disinfectant with excellent antimicrobial activity against a broad range of micro-organism, including the protozoan *Acanthamoeba spp*.[2,3,4] It is cidal for a wide range of bacteria and viruses in a relatively short exposure time to undiluted peroxide (less than 10 minutes) but requires a longer exposure time to undiluted peroxide for adequate disinfection of fungi, and protozoan trophozoites and cysts.[2,5] The need for adequate exposure times must be stressed for H_2O_2 peroxide systems to work effectively.

In a report at last year's British Contact Lens Association meeting, Professor Brien Holden called for much more focus on disinfection and less on convenience. He said, 'We may need to go back to two-step peroxides to kill bacteria and microbes that we are concerned about' and later added, 'that one-step peroxide could also be a fine solution given sufficient exposure time'.[6] There is only one readily available H_2O_2 system in the market that uses a time-release tablet to delay the neutralisation process to provide longer exposure of organisms to full strength peroxide.

Other advantages of the H_2O_2 disinfecting system include:

> **Despite being one of the earliest soft contact lens disinfectants, H_2O_2-based lens care is still the safest and most effective lens care system in the market**

- Penetrates the lens matrix–most other disinfectants are large molecules, which do not penetrate into the molecular 'pores' of the lens matrix.

Continued page 28

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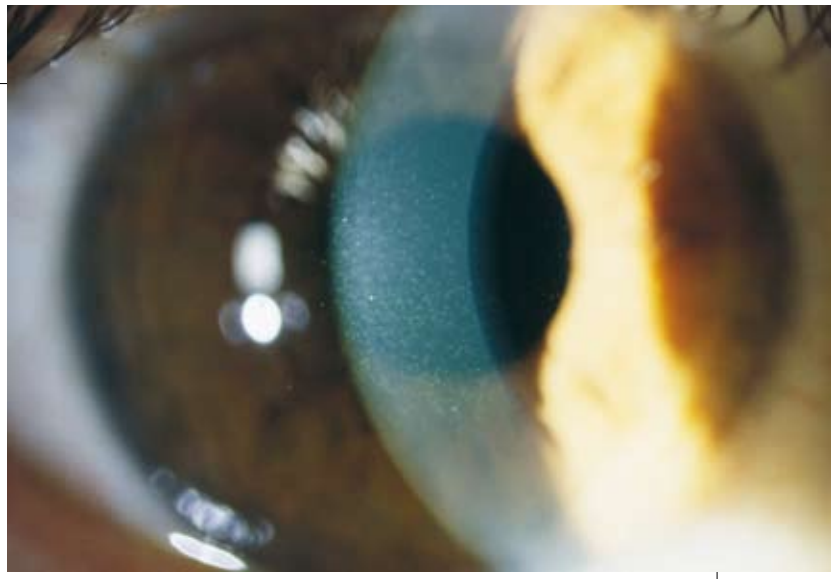
Hydrogen peroxide comeback

From page 26

- Provides surface-cleaning action—although not a lens cleaner, H_2O_2 may break protein and lipid bonds and aid in the removal of trapped debris.
- No accumulation in or on lenses.
- Compatible with all contact lens materials—including silicon hydrogels (SH) and rigid gas permeable contact lenses (RGPs or simply, GPs).



Generalised corneal SPK

Silicone hydrogel lenses are capturing an increasing share of the contact lens market because of their ability to reduce hypoxic stress on the anterior eye. This has allowed patients longer, safer and more comfortable wear of their contact lenses. Professor HD Cavanagh's studies[7,8,9,10] suggest that high oxygen permeable lenses, whether SH or RGP, when used in conjunction with a non-preserved LCP, offer the safest potential clinical choice for contact lens wear. In a report by Ewbank,[6] Dr V Evans from The Institute for Eye Research examined risk factors associated with corneal inflammatory events in soft lens daily wear (DW) and found a 10x risk increase when a MPS was used compared with H_2O_2 disinfection.[5]

Current research by Andrasko[11] and Carnt et al[12] have all shown that H_2O_2-based solutions are currently the only way to virtually eliminate solution-induced corneal staining (SICS) with silicone hydrogel lenses and despite some companies developing specialised LCPs for silicone lenses, they are still not as effective as H_2O_2 systems.

Despite being one of the earliest soft contact lens disinfectants, H_2O_2-based lens care is still the safest and most effective lens care system in the market, especially for SH lenses. Its acceptance as a disinfectant has been hindered in the past by:

- ocular toxicity if not neutralised properly
- greater cost
- perceived complexity
- long-term storage problems.

As outlined above, its benefits far outweigh its disadvantages and if the use of silicone hydrogel lenses continues to grow—which is almost certain—hydrogen peroxide disinfection systems will be on the comeback trail more than they have been.

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News briefs

Reference group

Optometrists Association Victoria Division is forming a Therapeutics Reference Group to guide the division on topical ocular therapeutics issues. Group members who meet specific criteria have been invited to participate and will provide advice and comment on matters such as the technical review of therapeutic resources, how therapeutic developments will affect Victorian optometrist prescribers, and the state's clinical guidelines and shared care arrangements.

Northern Territory

The Northern Territory's seven therapeutically-endorsed optometrists can now prescribe Ciprofloxacin and Ofloxacin. The fluoroquinolones were added to the territory's ocular therapeutics list after the Optometrists Board of the Northern Territory passed the motion on 13 March 2008. Queensland and Northern Territory Division executive director Greg Johnson said eye health care patients in the territory would benefit from the additions. 'It is a decision for commonsense and for better patient care and access,' he said.

QUT course

Queensland University of Technology's Graduate Certificate in Ocular Therapeutics will again be offered to interested optometrists. The second semester course lectures will be held on campus on 1-4 August, 22-25 August and 12-15 September. Optometrists wishing to enrol can email Greg Johnson at greg@optomsqld.com.

Glaucoma link

Antiepileptic drug topiramate has been linked with the development of angle-closure glaucoma. The Therapeutic Goods Administration has to date received 11 reports of angle-closure glaucoma occurring in patients being treated with the drug. In more than half of these cases, glaucoma developed within two months of treatment. Although rare, permanent vision loss can occur when taking topiramate, particularly if the use of the drug does not cease when glaucoma presents.

Novartis buys into Alcon

Swiss drug company Novartis is expected to acquire a minority stake in Alcon before the end of November 2008. An agreement with Nestlé, announced in April, will see Novartis acquire a 25 per cent stake in Alcon, with Nestlé remaining Alcon's majority shareholder. Novartis has the option of buying Nestlé's remaining 52 per cent share at a later date to become Alcon's majority shareholder. The entire acquisition process will cost Novartis an estimated US$39 billion. Alcon's vice president of Investor Relations and Strategic Communications, Doug MacHatton, said the acquisition would not affect the company's business operations in any way.

SteriLid

TheraTears' SteriLid eyelid cleaner has been developed to kill bacteria causing dry eye and blepharitis. The company says the product is the first to kill both gram-positive and gram-negative bacteria, and that it is suitable for people prior to surgery, or who wear punctual plugs to manage their dry eye. SteriLid does not require the use of cotton pads or swabs; users can apply the product with their fingertips to cleanse the eyelid and eye lashes. For more information visit www.theratears.com/sterilid.aspx.

Lucentis and Avastin review promising but head-to-head trial needed

Lucentis and Avastin are equally effective in improving the visual acuity of people with AMD, according to the findings of a review presented at the Association for Research in Vision and Ophthalmology 2008 annual meeting in April.

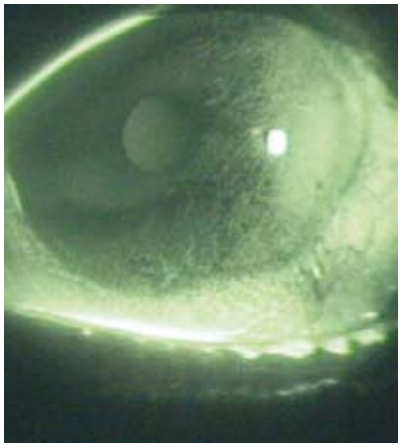
Researchers from the USA's Indiana University tracked the visual acuity of 42 patients injected with Avastin and 24 injected with Lucentis over a period of months and found no statistically significant difference between the drugs' performance.

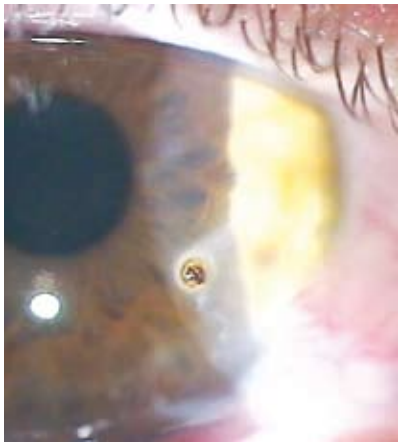
Dr Frances Cosgrove, from the university's Department of Ophthalmology, said that although no difference was found, a more detailed study was needed to confirm the findings.

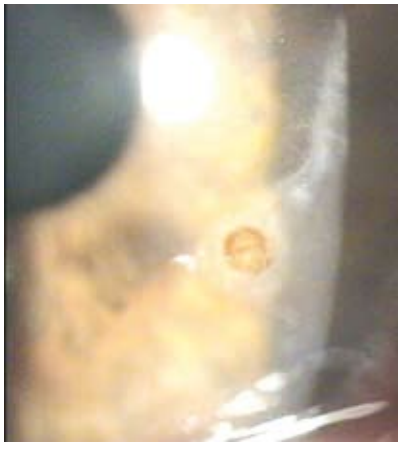
This could prove difficult, with the manufacturer of both drugs, Genentech, resistant to a head-to-head trial between the drugs.

Genentech promotes the ability of Avastin to treat several cancers. In February, the drug was approved by the Food and Drug Administration (FDA) to treat metastatic HER2-negative breast cancer in conjunction with paclitaxel chemotherapy. Genentech does not endorse it as an AMD treatment, saying it should be used only for FDA-approved treatments.

Clinical tip







Ocular foreign bodies

John Warren operates a sole practice in the Victorian rural centre of Traralgon, a two-hour drive east of Melbourne. As Traralgon is not serviced by full-time ophthalmologists, John's practice has gained a reputation for managing both acute and chronic presentations.

John participated in the UNSW Ocular Therapeutics Course in 1993 and completed his Victorian Ocular Therapeutics Registration in 2001. He installed slitlamp imaging cameras in both of his consulting rooms in 1998 and these cameras provide excellent documentation of conditions and pictures for patient education.

He offers his tips on ocular foreign bodies.

Corneal abrasions

1. The corneal track marks can point to the position of the foreign material under the top lid. If possible, try not to use anaesthetic. Everting the lid will relieve most of the pain and discomfort as the offending material will be away from the cornea. The relief that the patient experiences when the foreign matter is removed also provides a clinical indication that may be masked by an anaesthetic.
2. If you do not at first see the offending matter, keep looking. Something must be there if the patient is still symptomatic. You must find the 'needle in the haystack'.
3. Use the area of geographic scratching to point to the area of lid to inspect for foreign material.
4. Mucous debris may or will be forming under the top lid to cushion the eye from the foreign material. Mucous will also assist to expel the foreign material. The mucous may hide the foreign material. Removing the mucous will help you to find the foreign material if it is small.
5. Mucous debris absorbs the fluorescein stain. Use fluorescein to show the mucous debris to be removed.
6. Continue to search for and remove mucous and debris. You will eventually find it.
7. If using an anaesthetic, have the patient wait until it wears off before discharging them.
8. A Minim of chloramphenicol is sufficient prophylactic cover. QID until finished.
9. Review the patient the next day.

Stromal foreign body

1. Foreign body spuds work better than hypodermic needles.
2. Use your local dentist to individually packet and autoclave your foreign body spuds and alger brush tips.
3. Have more than one spud and alger brush tip. I have three spuds and two tips.
4. Use the larger spud to get under the foreign body in an attempt to remove as much of the foreign body as possible at one time. Do not pick at the surface and expect it to come out.
5. A hockey stick spud (my favourite) works well to assist to clear the rust ring before using the alger brush. You may not be able to remove all of the rust stain. Make sure all foreign material is removed.
6. Try and minimise disturbance to the epithelium.
7. Use chloramphenicol antibiotic cover to cover against infection. I would routinely instil one or two drops of cyclopentalate 1% to sedate the eye and minimise any anterior chamber reaction. Steroidal anti-inflammatories are not usually required. Liberal use of Celluvisc is helpful.
8. Consider patching if epithelial defect is greater than 2 x 2 mm.

PBS List of Medicines for Optometrists 20 May 2008

	Product	Restriction	Max qty	Repeats
Anti-viral eye preparations		Herpes simplex keratitis		
Aciclovir eye ointment 30 mg per g (3%), 4.5 g	Zovirax		1	0
Antibiotics		Unrestricted		
Chloramphenicol eye drops 5 mg/mL (0.5%), 10 mL	Chlorsig		1	2
	Chloromycetin		1	2
Chloramphenicol eye ointment 10 mg/g (1%), 4 g	Chlorsig		1	0
	Chloromycetin		1	0
Sulfacetamide Sodium eye drops 100 mg per mL (10%), 15 mL	Bleph-10		1	2
Anti-inflammatory agents		Unrestricted		
Fluorometholone eye drops 1mg/mL (1%), 5mL	Flucon		1	0
	FML Liquifilm		1	0
Flurbiprofen Sodium eye drops 300 µg per mL (0.03%) single dose units 0.4 mL, 5	Ocufen		1	0
Hydrocortisone Acetate eye ointment 5 mg per g (0.5%), 5 g	Hycor		1	0
Hydrocortisone Acetate eye ointment 10 mg per g (1%), 5 g	Hycor		1	0
Anti-allergy agents		Vernal kerato-conjunctivitis		
Sodium cromoglycate eye drops 20 mg per mL (2%), 10 mL	Cromolux		1	5
	Opticrom		1	5
Topical ocular lubricants		Severe dry eye inc Sjogren's synd		
Carbomer 980 ocular lubricating gel 2 mg per g (0.2%), 10 g	Geltears		1	5
	PAA		1	5
	Viscotears Liquid Gel		1	5
Carmellose sodium eye drops 10 mg per mL (1%), 15 mL	Refresh Liquigel		1	5
Carmellose sodium eye drops 5 mg per mL (0.5%), 15 ml	Refresh Tears plus		1	5
Hypromellose eye drops 3 mg per mL (0.3%), 15 mL (contains sodium perborate)	In a Wink Moist'ing		1	5
	Genteal		1	5
Hypromellose eye drops 5 mg per mL (0.5%), 15 mL	Isopto Tears		1	5
	Methopt		1	5
Hypromellose with Carbomer 980 ocular lubricating gel 3 mg-2 mg/g (0.3-0.2%), 10 g	HPMC PAA		1	5
	Genteal gel		1	5
Hypromellose with Dextran eye drops 3 mg-1 mg/mL (0.3%-0.1%), 15 mL	Poly-Tears		1	5
	Tears Naturale		1	5
Polyethylene glycol 400 with Propylene glycol drops 4 mg-3 mg/mL (0.4-0.3%); 15 mL	Systane		1	5
Polyvinyl alcohol eye drops 14 mg per mL (1.4%), 15 mL	PVA Tears		1	5
Polyvinyl alcohol eye drops 30 mg per mL (3%), 15 mL	PVA Forte		1	5
Polyvinyl alcohol eye drops 14 mg per mL (1.4%), 15 mL	Liquifilm Tears		1	5
Polyvinyl alcohol eye drops 30 mg per mL (3%), 15 mL	Liquifilm Forte		1	5
Polyvinyl alcohol eye drops 14 mg per mL (1.4%), 15 mL (contains sodium chorite/hydrogen peroxide as preservative)	Vistil		1	5
Polyvinyl alcohol eye drops 30 mg per mL (3%), 15 mL (contains sodium chorite/hydrogen peroxide as preservative)	Vistil Forte		1	5
Unpreserved unit dose ocular lubricants		Authority required:		
Carbomer 974 ocular lubricating gel 3 mg per g (0.3%), single dose units 0.5 g, 30	Poly Gel	Severe dry eye syndrome in patients sensitive to	3	5
Carbomer 980 eye drops 2 mg per (0.2%) , single dose units 0.6 mL, 30	Viscotears	preservatives in multi-dose eye drops	3	5
Carmellose sodium eye drops 5 mg per mL (0.5%), single dose units 0.4 mL, 30	Cellufresh		3	5
Carmellose sodium eye drops 10 mg per mL (1%) , single dose unit 0.4 mL, 30	Celluvisc		3	5
Carmellose sodium eye drops 2.5 mg per mL (0.25%), single dose units, 0.6 mL, 24	TheraTears		4	5
Carmellose sodium ocular lubricating gel 10 mg per mL (1%), single dose 0.6 mL, 28	TheraTears		3	5
Hypromellose with Dextran eyedrops 3-1 mg per mL (0.3-0.1%), single 0.4 mL, 28	Bion Tears		3	5
Tamarindus indica seed polysaccharide eye drops 10 mg per mL, 0.5 mL, 20	Visine Professional		3	5
Topical ocular lubricant ointments		Unrestricted		
Paraffin compound eye ointment 3.5 g	Polyvisc		2	5
Paraffin pack containing 2 tubes compound eye ointment 3.5 g	Polyvisc (2 pack)		1	5
Paraffin compound eye ointment 3.5 g	Duratears		2	5
Paraffin pack containing 2 tubes compound eye ointment 3.5 g	Ircal (2 pack)		1	5
	Lacri-Lube (2 pack)		1	5

Controlled substances that may be used or prescribed by optometrists

Ocular Medicine	Vic	Tas	Qld	NSW & ACT	NT	SA	WA	PBS Optometry	PBS Approved
Anti-infectives									
Bacitracin	✓	✓	✓	–	✓	✓	–	N/A	N/A
Chloramphenicol	✓	✓	✓	✓	✓	✓	–	✓	✓
Ciprofloxacin	✓	✓	✓	–	✓	✓	–	–	✓
Framycetin	✓	✓	✓	✓	✓	✓	–	–	✓
Gentamicin sulfate	✓	✓	✓	–	✓	✓	–	–	✓
Gramicidin	✓	–	✓	✓	–	✓	–	N/A	N/A
Neomycin	✓	✓	✓	✓	✓	✓	–	N/A	N/A
Ofloxacin	✓	✓	✓	–	✓	✓	–	–	✓
Polymyxin	✓	✓	✓	✓	✓	✓	–	N/A	N/A
Sulfacetamide	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tetracycline	✓	✓	✓	✓	✓	✓	–	N/A	N/A
Tobramycin	✓	✓	✓	–	✓	✓	–	–	✓
Aciclovir	✓	✓	✓	–	✓	✓	–	✓	✓
Anti-inflammatories									
Dexamethasone	✓	✓	◆	–	✓	✓	–	–	✓
Fluorometholone	✓	✓	✓	✓	✓	✓	–	✓	✓
Fluorometholone accetate	✓	✓	✓	✓	✓	✓	–	–	✓
Hydrocortisone	✓	✓	✓	✓	✓	✓	–	✓	✓
Prednisolone	✓	✓	◆	–	✓	✓	–	–	✓
Diclofenac	✓	✓	✓	✓	✓	✓	–	N/A	N/A
Flurbiprofen	✓	✓	✓	✓	✓	✓	–	✓	✓
Ketorolac	✓	✓	✓	✓	✓	✓	–	N/A	N/A
Decongestants & anti-allergics									
Ketotifen	✓	✓	✓	✓	✓	✓	✓	N/A	N/A
Levocabastine	✓	✓	✓	✓	✓	✓	–	N/A	N/A
Lodoxamide	✓	✓	✓	✓	✓	✓	–	N/A	N/A
Olopatadine	✓	✓	✓	✓	✓	✓	–	N/A	N/A
Sodium cromoglycate	✓	✓	✓	✓	✓	✓	✓	✓	✓
Anti-glaucoma preparations									
Apraclonidine	✓	–	◆	✓	–	✓	–	–	✓
Betaxolol	✓	–	◆	✓	–	✓	–	–	✓
Bimatoprost	✓	–	◆	✓	–	✓	–	–	✓
Brimonidine	✓	–	◆	✓	–	✓	–	–	✓
Brinzolamide	✓	–	◆	✓	–	✓	–	–	✓
Carbachol	✓	–	◆	✓	–	✓	–	N/A	N/A
Dipivefrine	✓	–	◆	✓	–	✓	–	–	✓
Dorzolamide	✓	–	◆	✓	–	✓	–	–	✓
Latanoprost	✓	–	◆	✓	–	✓	–	–	✓
Levobunolol	✓	–	◆	✓	–	✓	–	–	✓
Pilocarpine	✓	–	◆	✓	–	✓	–	–	✓
Timolol	✓	–	◆	✓	–	✓	–	–	✓
Travoprost	✓	–	◆	✓	–	✓	–	–	✓
Mydriatics & cycloplegics									
Atropine	✓	✓	✓	✓	✓	✓	–	–	✓
Cyclopentolate	✓	✓	✓	✓	✓	✓	✓	N/A	N/A
Homatropine	✓	✓	✓	✓	✓	✓	–	–	✓
Pilocarpine	✓	✓	✓	–	✓	✓	–	–	✓
Phenylephrine	✓	✓	✓	✓	✓	✓	–	N/A	N/A
Tropicamide	✓	✓	✓	✓	✓	✓	✓	N/A	N/A
Local anaesthetics									
Amethocaine	✓	✓	✓	✓	✓	✓	–	N/A	N/A
Lignocaine	✓	✓	–	–	✓	✓	–	N/A	N/A
Oxybuprocaine	✓	✓	✓	✓	✓	✓	✓	N/A	N/A
Proxymetacaine	✓	✓	✓	✓	✓	✓	✓	N/A	N/A

◆ The use of these medicines by optometrists is currently being considered

N/A Substance is not available under the PBS

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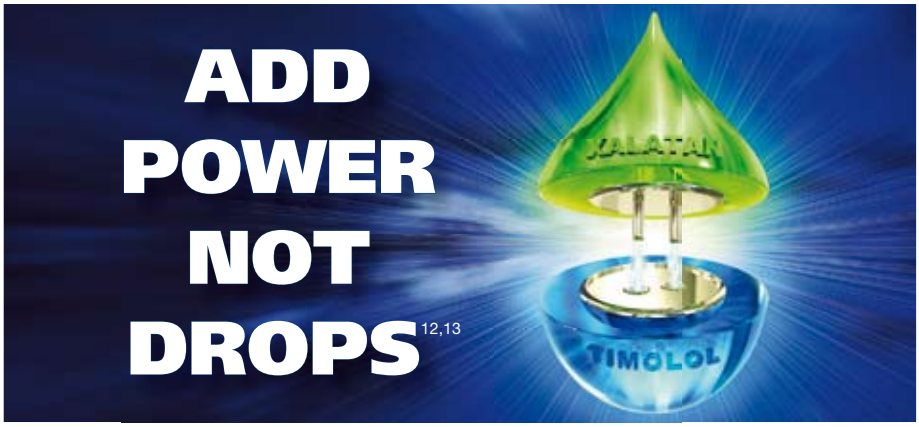
dedicated to being a valued partner in eye care

Efficacy[1-4]
+
Tolerability[1-3,7-11*]
=
FIRST LINE
Xalatan®
latanoprost



THE POWER OF ONE.[12,13]
Once Daily
Xalacom™
latanoprost/timolol maleate

Xal-Ease™
Complementary

*Refers to ocular hyperaemia compared to other prostaglandins and systemic adverse events compared to timolol.

PBS Information: This drug is listed on the PBS for the treatment of Open Angle Glaucoma and Ocular hypertension.

Before prescribing, please refer to Approved Product Information. Full Approved PI is available on request from Pfizer. MINIMUM PRODUCT INFORMATION. XALATAN® (Latanoprost 50 micrograms/mL) Eye Drops INDICATIONS Reduction of intraocular pressure (IOP) in patients with open-angle glaucoma or ocular hypertension. CONTRAINDICATIONS Hypersensitivity to ingredients. PRECAUTIONS Change in eye colour due to increased iris pigmentation, heterochromia; eyelid skin darkening; changes in eyelashes and vellus hair; macular oedema; other types of glaucoma; pseudophakia; aphakia; contact lenses. Severe or brittle asthma. Pregnancy category B3, lactation. Children. Interactions: other prostaglandins, thiomersal. Blurring of vision. ADVERSE EFFECTS Increased iris pigmentation; eye irritation (burning, grittiness, itching, stinging and foreign body sensation); eyelash and vellus hair changes (darkening, thickening, lengthening, increased number); mild to moderate conjunctival hyperaemia; transient punctate epithelial erosions; blepharitis; eye pain; conjunctivitis; vision blurred; eyelid oedema, macular oedema. Muscle/joint pain; dizziness; headache; localised skin reaction on the eyelids; skin rash. Uncommonly: keratitis; non-specific chest pain; Others, see full PI. DOSAGE AND ADMINISTRATION One eye drop in the affected eye(s) once daily. Other eye drops at least 5 minutes apart. REFER TO PRODUCT INFORMATION BEFORE PRESCRIBING The full disclosure Product Information is available on request from Pfizer Australia Pty Ltd. NAME AND ADDRESS OF THE SPONSOR Pfizer Australia Pty Ltd ABN 50 008 422 348, 38-42 Wharf Road, West Ryde, NSW 2114. Full PI approved by the TGA on 4 February 2003, last amended 20 November 2006. PBS dispensed price, September 2007: $36.65. References: 1. Parrish RK *et al. Am J Ophthalmol* 2003;135:688-703. 2. Gandolfi S *et al. Advances in Therapy* 2001;18(3):110-121. 3. Netland PA *et al. Am J Ophthalmol* 2001;132:472-484. 4. Hedman K *et al. Surv Ophthalmol* 2002;47(Suppl 1):S65-S76. 5. Reardon G *et al. Eur J of Ophthalmol* 2003;13(Suppl 4):S44-S52. 6. Stewart WC *et al. Rev of Ophthalmol* 2002;9(4). Accessed via URL http://www.revophth.com/index.asp?page=1_83.htm. 7. Noecker RS *et al. Am J Ophthalmol* 2003;135:55-63. 8. Watson P *et al. Ophthalmology* 1996;103:126-137. 9. Konstas AGP *et al. Am J Ophthalmol* 1999;128:15-20. 10. Mishima HK *et al. Arch Ophthalmol* 1996;114:929-932. 11. Alm A *et al. Ophthalmology* 1995;102:1743-1752. ®Registered trademark of Pfizer Inc. Pfizer Medical Information 1800 675 229. 04/08 PFXXA7518-B/FC

PBS Information: Restricted benefit:
This product is listed on the PBS for the reduction of elevated intra-ocular pressure in patients with OH or POAG who are not adequately controlled with timolol maleate 5mg (base) per mL (0.5%) eye drops or latanoprost eye drops.

Before prescribing, please refer to Approved Product Information. Full Approved PI is available on request from Pfizer. MINIMUM PRODUCT INFORMATION. XALACOM® Eye Drops (latanoprost 50µg/mL and timolol 5mg/mL). INDICATIONS. Reduction of IOP in open-angle glaucoma and ocular hypertension, if insufficient response to other medications. Not for initial therapy. CONTRAINDICATIONS. Reactive airway disease including bronchial asthma (and history), or severe COPD. Sinus bradycardia, second or third degree atrioventricular block, overt cardiac failure, or cardiogenic shock. Hypersensitivity to ingredients. PRECAUTIONS. Beta-blocker systemic effects: cardiovascular/respiratory reactions; consider gradual withdrawal prior to major surgery; anaphylactic reactions; caution in hypoglycaemia, diabetes, hyperthyroidism, myasthenia gravis; concomitant beta-blocker or prostaglandin not recommended. Ocular: change in eye colour due to increased iris pigmentation, heterochromia; eyelid skin darkening; changes in eyelashes and vellus hair; macular oedema; caution in other types of glaucoma, pseudophakia, aphakia, filtration. Contact lenses. Pregnancy category C, do not use; lactation. Children. Interactions: additive effects with other drugs; thiomersal. Blurring of vision. ADVERSE EFFECTS. Ocular: eye irritation, hyperaemia, abnormal vision, visual field defect, increased iris pigmentation, eyelash and vellus hair changes, corneal oedema and erosions. Systemic: serious respiratory and cardiovascular events (worsening of angina pectoris, pulmonary oedema), anaphylaxis. Others, see full PI. DOSAGE AND ADMINISTRATION. One eye drop in the affected eye(s) once daily. Other eye drops at least 5 minutes apart. REFER TO PRODUCT INFORMATION BEFORE PRESCRIBING The full disclosure Product Information is available on request from Pfizer Australia Pty Ltd. NAME AND ADDRESS OF THE SPONSOR Pfizer Australia Pty Ltd, ABN 50 008 422 348, 38-42 Wharf Road, West Ryde, NSW 2114. Full PI approved by the TGA on 25 November 2002, last amended on 20 November 2006. PBS dispensed price, September 2007: $43.50. References: 12. Higginbotham EJ *et al. Arch Ophthalmol* 2002; 120: 915–22. 13. Konstas AGP *et al. Arch Ophthalmol* 2005; 123: 898–902. www.pfizer.com.au ®Registered trademark of Pfizer Inc. Pfizer Medical Information 1800 675 229. 04/08 PFXXA7518-B/FC

eye drops - olopatadine

Patanol®

Prescription strength allergy relief

Give your patients effective protection[1] this ocular allergy season...

℞ PATANOL®

Alcon®

PBS Information: This product is not listed on the PBS.

Please review Approved Product Information before prescribing. Full Product Information is available on request from Alcon Laboratories (Australia) Pty Ltd. PATANOL® (olopatadine) 0.1% Eye Drops Abridged Product Information. Use: Treatment of signs and symptoms of seasonal allergic conjunctivitis for up to 14 weeks. **Contraindications:** Hypersensitivity. **Precautions:** Not for injection or oral ingestion, pregnancy (Category B1), lactation, children below 3 years of age. Caution should be taken when driving or operating machinery if blurred vision is experienced. **Adverse Reactions:** Headaches, asthenia, blurred vision, burning or stinging, cold syndrome, dry eye, foreign body sensation, hyperaemia, hypersensitivity, keratitis, lid oedema, nausea, pharyngitis, pruritus, rhinitis, sinusitis and taste perversion. **Dosage:** One to two drops of PATANOL Eye Drops in the affected eye(s) twice daily. ® Registered trademark. Alcon Laboratories (Australia) Pty Ltd. ABN 88 000 740 830, 10/25 Frenchs Forest Road East, Frenchs Forest, NSW 2086. POPH 1455 **References: 1.** PATANOL Approved Product Information.