

Case studies in contact lenses

A 22-year-old female university student wearing Proclear 1 Day (omafilcon A) lenses on a full-time daily wear basis was referred by an optometric colleague for therapeutic management of contact lens-induced red eyes. The patient had been wearing her lenses for approximately 16 hours per day over a 14-month period. She presented with a two-week onset of increasing ocular discomfort, redness, mild photophobia and tearing. These symptoms were reported to be getting significantly worse but she had continued to over-wear her hydrogel daily disposables because she disliked wearing spectacles and found contact lenses were far more convenient for her lifestyle. Her previous practitioner had recently noted an increase in myopia of -0.75D bilaterally over a five-month period.

The daily disposable lenses she was wearing were recommended by her previous practitioner to minimise her longstanding dry eyes associated with chronic acne, atopy and mild lid margin disease. Omafilcon A has an FDA approval as an option for dry eyes.¹ Although the patient felt her vision had been generally good with her lenses, 'they felt dry and uncomfortable towards the end of the day'. Past ocular history revealed previous episodes of 'red puffy eyes' and sterile marginal keratitis. She occasionally used rewetting drops and topical anti-histamines for hay-fever related ocular allergies.

Visual acuity of 6/7.5+ was recorded binocularly with her lenses and slightly reduced monocular acuities recorded in her left eye (6/9+2), which was the most affected eye. It was necessary to first manage the anterior segment pathology which was primarily due to corneal hypoxia – the main underlying cause for her presenting symptoms. A subsequent re-fit from hydrogel to silicone hydrogel (SiH) daily disposable was prudent to restore the corneal physiology, eliminate the anterior segment hypoxic signs and minimise the risk of red eye and inflammatory episodes such as this in the future. Additionally, the aim was to optimise visual performance, improve perceived comfort and offer better relief from her dry eye problems.

The initial assessment is summarised in Table 1.

In the latest in our quarterly series of contact lens problem solving, **Nisha Jeyaseelan** describes how corneal health in a compromised eye can be restored by refitting into a SiH daily disposable lens

TABLE 1 Initial assessment

	Right eye	Left eye
Refraction	-3.50/-0.75 x 20 6/6 ⁻²	-2.00/-0.25 x 180 6/7.5
K readings	7.72 @ 108/7.80 @ 18	7.68 @ 80/7.71 @ 170
CLs on initial presentation	Proclear 1 Day 8.6/14.2/-3.75 6/7.5	Proclear 1 Day 8.6/14.2/-1.75 6/9 ⁺² with difficulty
Trial CLs dispensed after three days of all lens cessation	1 day Acuvue TruEye 8.5/14.2/-3.50 6/6 ⁺³	1 day Acuvue TruEye 8.5/14.2/-1.75 6/6 ⁻¹
Prescribed lenses after four weeks	1 day Acuvue TruEye 8.5/14.2/-3.25 6/4.5	1 day Acuvue TruEye 8.5/14.2/-1.75 6/4.5

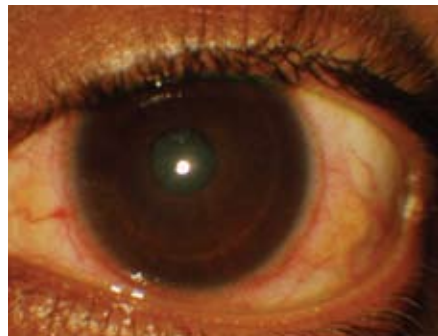


Figure 1 LE moderate bulbar conjunctival injection and marked limbal hyperaemia (few minutes after removing lenses)

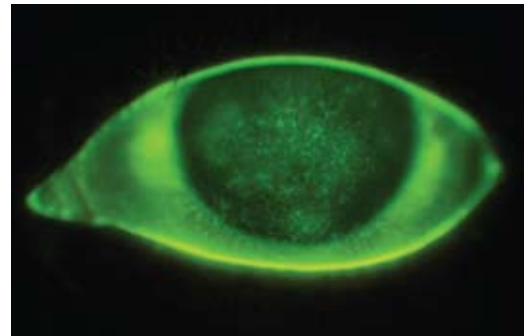


Figure 2 LE diffuse corneal punctate epitheliopathy on presentation (few minutes after removing lenses)

Slit-lamp examination

Detailed slit-lamp evaluation revealed moderate bulbar conjunctival hyperaemia and fluorescein staining and marked limbal hyperaemia in both eyes (Figure 1). Also evident were moderately diffused corneal punctate epitheliopathy which stained with fluorescein and mild corneal striae and sub epithelial haze (Figure 2). There were also signs of bilateral mild blepharitis and tear evaporative dry eyes. No corneal infiltrates, ulcers or anterior chamber reaction were evident. The hydrogel daily disposables worn exhibited minimal movement on blinking and similarly on the push-up test. On day three, after temporary cessation of lens wear to facilitate corneal healing (epithelial staining) and with the use of palliative and prophylactic topical drops (non-preserved tear lubricant and a broad spectrum antibiotic) to rapidly help resolve corneal staining, the patient reported that her eyes felt much better. The adverse acute slit-lamp signs had resolved on examination. Ten days after

refitting the patient into a SiH daily disposable, the cornea remained healthy and free of hypoxic signs and the patient was delighted with the outcome.

Management and discussion

This case outlines common challenges faced with contact lens induced-corneal hypoxia and dry eyes associated with both lens wear and atopy/lid margin disease in a patient who sought to wear contact lenses for all waking hours for as long as she could. Such issues can now be successfully and rapidly overcome by careful selection of lens wear modality, lens material and/or care regime.² In this case, the problem was addressed by using a different daily disposable lens with a unique material, 1-Day Acuvue TruEye (narafilcon A), which offered higher oxygen performance combined with excellent wettability and lubricity. The low coefficient of friction has also been linked with improved comfort and minimal lens induced ocular tissue mechanical trauma.^{3,4} A refit



into a high Dk/t SiH lens substantially improved the oxygen performance and significantly reduced the corneal hypoxic signs within just days as clearly evident here – much whiter bulbar conjunctiva, minimal limbal hyperaemia and clear non-staining corneal epithelium (Figures 3 and 4).

There were a number of risk factors for the red eye presentation and ocular discomfort symptoms revealed in this case study which should be clarified. Firstly, the patient had some underlying mild blepharitis and atopy which arguably had not been adequately pre-managed. Importantly however, at no stage had signs or symptoms of critical corneal hypoxic insult been previously managed by changing the lens material. The first important decision was to manage the patient's red eyes therapeutically with a combined strategy of no lens wear for three days and frequent intensive application of non-preserved artificial tear supplements to ensure good lubrication, reduce the discomfort and rapidly resolve some of the diffuse epithelial staining. The patient was keen to return to contact lens wear as soon as possible to enable her to participate in a netball tournament. A topical broad spectrum antibiotic (Chloramphenicol drops 1 *gutte qid* both eyes for three days) was also prescribed prophylactically on day one, in the presence of moderately staining corneal punctate epithelium to minimise the risk of a secondary infection in an already compromised cornea. As a therapeutically licensed optometrist from New Zealand (currently more than one third of optometrists in New Zealand are therapeutically qualified), the author opted for the management strategy outlined above. Chloramphenicol is also available here in the UK and is accepted for optometric use.

Day three follow-up

The adverse acute anterior segment signs had resolved by day three and topical drops were tapered and discontinued accordingly and a programme of lid hygiene initiated. Re-fitting a SiH daily disposable lens was considered a worthy and essential management strategy in this patient who suffered from moderate corneal hypoxia, ocular surface dry eyes, atopy and increasing discomfort and habitually wore her lenses for all waking hours. It was critical to keep the patient in a daily disposable to eliminate lens deposition issues which atopy sufferers are typically prone to and avoid care-solution associated

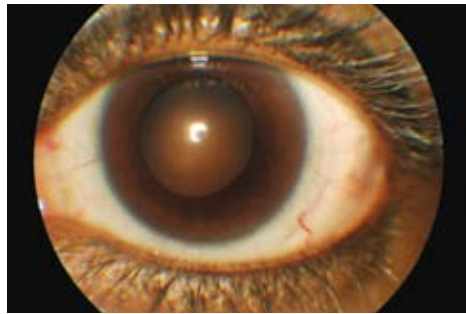


Figure 3 LE 1.5 weeks later wearing 1 Day Acuvue TruEye (whiter, healthier eyes)

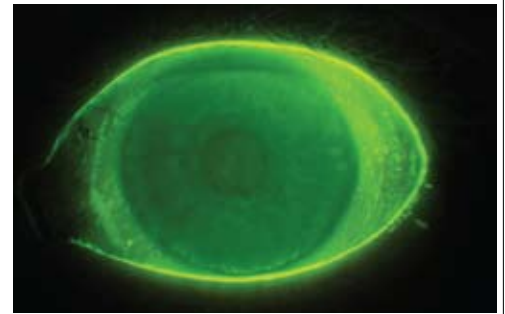


Figure 4 LE 1.5 weeks later after wearing 1 Day Acuvue TruEye (clear cornea with no NFL epithelial staining)

corneal toxicity.⁵ An immediate marked improvement in comfort and vision was reported by the patient while still in the consulting room wearing her new lenses. A SiH daily disposable (1-Day Acuvue TruEye) was deemed the right lens of choice to here eliminate corneal hypoxia and maintain better ocular surface integrity in the future. The patient was advised that sometimes it may take a few days to adapt to the new and better material,⁶ but she accepted and tolerated the lenses quite well. Ten pairs of diagnostic lenses were dispensed for a 10-day trial period and a review was arranged to evaluate corneal health, vision and lens comfort.

Day 10 follow-up

The patient was able to wear her new SiH lenses comfortably for 12 hours per day over the 10-day review period (and resume to 16 hours per day, her habitual wearing time after 10 days with the increase in oxygen performance of the SiH material) and was delighted with the outcome. A significant improvement in the end-of-day comfort compared to her previous hydrogel lenses was also reported. She could see the benefits of the SiH lens in the form of 'whiter eyes'. The final lens refraction had also slightly dropped, less minus power, most likely as a result of less hypoxia-induced myopic creep or corneal swelling.⁷ The patient was instructed to return after one month for her next contact lens aftercare.

Summary

Following resolution of acute anterior segment pathology, it was critical to refit the patient into a material to maximise oxygen performance. SiHs, with their generally lower water content can be beneficial in the management of marginal dry eyes.⁸ Daily disposables were the best option in this patient who had a longstanding history of atopy and chronic lid margin disease to ensure minimal lens deposition. With the advent of better and

newer SiH lens materials with unique properties, a daily disposable lens with a good balance of material properties combining high oxygen performance, good wettability and superior comfort was chosen to address corneal hypoxia and dry eyes. This enabled the patient to wear her lenses comfortably for longer periods without compromising corneal physiology. The UV-blocking in narafilcon A was an additional health benefit for this active patient. It should be emphasised that a significant portion of the initial presenting symptoms and signs were resolved in a short time without complex management strategies or the need for further therapeutic treatment and/or ophthalmological referral by simply fitting a SiH daily disposable lens. ●

References

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● New Zealand therapeutically qualified optometrist **Nisha Jeyaseelan** is a professional affairs associate for Johnson & Johnson Vision Care, UK & Ireland