

MANAGING EYE HEALTH CHANGES

Since cosmetic extended wear lenses were first approved for marketing in the U.S. in 1981, the debate over their safety has intensified, not abated.

Today, this debate takes on a new urgency. About 26 percent of all soft lenses prescribed are extended wear lenses, and the number of new fits of extended wear is on the rise (Fig. 1).¹

Even after three years' clinical experience using FDA-approved cosmetic extended wear lenses, eye doctors here are more divided than ever about the new lenses' potential to harm their patients.

On one side, there have been many positive reports in the journals, including this one,^{2,3} about cosmetic extended wear. Consumer ads and enthusiastic doctors are spreading the "gospel" of extended wear, too. One of the many doctors I've spoken to told me of clinical trials in which there were 13,000 patient visits without adverse responses.

On the other side are other doctors who tell of patients blinded as a result of cosmetic extended wear.^{4,5} Many an enthusiastic fitter has changed his mind when he does run across the tissue changes known to be associated with extended wear lenses (Table 1). Hodd's attitude toward extended wear hardened, after long experience in Great Britain, because he found "too many cases of recurrent infections."⁶

The serious physiological changes related to extended contact lens wear are well known. Holden and Zantos list them as:^{7,8}

- Acute adverse reactions;
- Infections;
- Chronic corneal damage.

This article will hopefully help each doctor form a "balanced" view of the potential for extended wear's serious complications and explain how to handle them.

Acute adverse reactions

Acute adverse reactions to extended wear are generally lens related, due either to an improper fit or lens contamination.

Acute reactions range from corneal edema to epithelial decompensation, neovascularization, corneal

infiltrates, and vascular hyperemia.

One response often experienced by extended wear patients is the so-called "red eye." This syndrome includes many of the other adverse responses which first will be discussed separately.

Corneal edema.—It's normal for most patients wearing the currently approved hydrogel extended wear lenses to have some corneal edema.

The cornea of the wearer may swell 10 to 15 percent overnight and two to three percent during the day. This swelling tends to be significantly less near the limbus than it is in the central region.⁹

The long-term effect of the residual low level open-eye edema is not yet known.

The daily fluctuation in the edema response is easy to confirm. Generally, vertical striae observed at morning progress visits disappear by the time the patient returns later in the day.¹⁰ These striae are prominent during the first few weeks of extended wear and may even last several months without associated signs or symptoms.¹¹

Corneal infiltrates.—Infiltrates are discrete foci in the anterior stroma, usually limited to the peripheral cornea. They are an accumulation of inflammatory cells in the cornea, and their presence indicates that white blood cells have penetrated the cornea in response to inflammation or infection.¹²

After the extended wear lens is removed, patient symptoms may disappear within one day. However, Zantos and Davies suggest that it is necessary to avoid lens wear for at least a week, by which time the infiltrates will usually disappear.¹¹

Microvesicles.—Irregular, high index bubbles which develop in the corneal epithelium some weeks after extended lens wear are epithelial microvesicles or microcysts. These bubbles, only about 30 microns in diameter, generally cause no problems if their number re-

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Is extended wear safe or risky? Here's how to reach a "balanced" view of the potential for extended wear's serious complications.

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mains small. When the microvesicle count tops 50, however, the patient's visual acuity begins to drop. At this point, have the patient cease lens wear; his acuity will recover completely after several weeks without contact lenses.¹³

Microvesicles originate from lens bearing pressure and subsequent disorganized cell growth or debris. This begins in the basement layer and moves forward.¹⁰ In the early stages, there is no staining. Eventually, when the microvesicles break through the surface of the epithelium, there is a punctate staining.⁷

Zantos gives an excellent description of the retro-illumination technique for practitioners who want more information on slit lamp observation of microvesicles.¹³

Vascularization.—In your pre-fitting exam, you should note any vessels extending more than 1 mm beyond the visible iris and the overall level of limbal vessel injection. Later, this baseline data will help you evaluate the development of corneal vascularization.

Ghost vessels associated with previous pathology can also be seen with a slit lamp using marginal retroillumination.

In your follow-up exams, look for new vessels and chronically injected limbal capillaries. New vessels will look like spikes projecting from the normal limbal loops.¹⁴ Chronically injected limbal capillaries predispose patients to vascularization and are a sign that the contact lens fitting, maintenance or patient management should be improved.

"Red Eye" response.—The so-called "red eye" response is an acute inflammatory response of the anterior eye. Its signs and symptoms include some of the acute adverse reactions already discussed and listed in Table 2.

The red eye response is probably a reaction to debris trapped behind the contact lens.^{9,15} The trapped debris causes a self-immune reaction and a red eye response.

Almost every patient with extended wear lenses has debris trapped under his lenses when he opens his eyes in the morning (Table 3). During the day, lens movement must clear the debris from behind the lens in order to prevent the red eye response.

Holden and his colleagues have shown that the chance of developing a red eye response diminishes as

the amount of lens movement increases.¹⁶ Thus, it is vital to assure good lens movement for the patient with extended wear lenses.

Besides providing adequate movement to prevent local drying of the cornea, the lens must move well enough to provide tear exchange and so to prevent the accumulation of debris behind the lens.

The inflammatory response has been observed 24 to 48 hours after overnight lens wear if the trapped debris is not eliminated.¹⁶

You can prevent the red eye response by assuring that the lens has adequate movement or by removing and rinsing the lens if you see trapped debris at a progress visit.

Infections

Eye infections among extended wear patients generally result from a combination two factors: epithelial changes induced by prolonged contact lens wear and poor patient compliance. Poor compliance generally results in contamination of the solutions or storage case.

Eye infections seem to occur more often among extended wear patients in warm climates than in cool ones.

The incidence of serious infection is higher among extended wear patients than among either daily-wear soft or hard contact lens patients, according to two recent studies.^{17,18} "Serious" infections were those such as central corneal ulcer or keratoplasty that resulted in blindness or visual acuity of 20/60 or worse. Both of the studies, one conducted in Australia and the other in Scandanavia, had remarkably similar results:

Lens type	Complication rate
Hard Contact Lenses	0
Daily Wear Soft Lenses	0.01%
Extended Wear Lenses	0.03%

Based on these studies, the incidence of serious infections among extended contact lens wearers is three cases in 10,000 patients.

Chronic corneal damage

Chronic corneal damage is one adverse result of contact lens wear. For example, polymegathism—the occurrence of endothelial cells which vary widely in size and shape—has already been documented among contact lens wearers.¹⁹ The difference in size between the smallest and largest cells is a sign of disturbed metabolic function.

TABLE 1
Documented tissue changes associated with extended wear

Superficial punctate epithelial staining
Epithelial erosion
Keratoconjunctivitis
Epithelial microvesicles (microcysts)
Corneal infiltrates
Infective keratitis, ulcers
Corneal vascularization
Increased endothelial polymegathism

TABLE 2
Signs and symptoms of a red eye response

Epithelial decompensation
Limbal and conjunctival hyperemia
Ciliary injection
Aqueous flare
Stromal infiltrates
Epithelial microvesicles
Endothelial bedewing
Photophobia
Pain and discomfort

Source: Mertz and Holden

Holden and his colleagues showed that these changes in the endothelium are well correlated to the degree of lens movement.¹⁶ That is, polymegathism increases as lens movement decreases. While 54 percent polymegathism results on average from lenses with no movement, only 20 percent results from lenses with 2 mm of movement.

Clinical suggestions

Considering the variety of physiological changes and the range of adverse reactions to cosmetic extended wear, the real challenge is in making extended wear lenses work. Here are a few clinical suggestions to help you achieve that goal.

Lens movement.—Be sure that the lenses are fitted loose and move well. This will prevent accumulation of debris beneath the lens—the cause of the “red eye” response—and will decrease polymegathism.

Also remember: Many of today's high-water content, extended wear lenses are sensitive to heat. As the lens stabilizes on the eye, it loses water and its parameters change.

Convenience wear.—The ideal extended wear lens is one which can be converted from daily wear to extended wear. It's better to fit a lens that's tough enough to be handled by the patient than one that can't be handled often. Then, the patient can consider extended wear when it would be inconvenient to remove his lenses.

Success breeds success.—Should a patient demonstrate a successful physiological response to daily wear before you prescribe extended wear? Opinions vary. Zantos and Davies found that patients respond the same to extended contact lens wear whether they have worn daily wear lenses before or not.¹¹

But it's safe to say that any lens which causes physiological problems in daily wear will cause those same problems, and perhaps worse ones, if worn for extended periods. For this reason, I prefer my patients to start on a daily wear schedule before they begin extended wear. This also ensures that they will be able to handle and remove their lenses when necessary.

Patient education.—Proper patient education is a must for two reasons. First, patient compliance with the prescribed regimen is vital to extended wear success, even

more so than it is for daily hard or soft contact lens wear.

Second, patients must learn to recognize potentially serious complications of extended contact lens wear. They must be warned to contact the doctor at once if they develop a “red eye” response or another unusual sign or symptom.

Yamane suggests teaching patients to assess their eyes and lenses each morning.²⁰ This instruction, referred to as “feel good, look good and see good,” is summarized in Table 4.

“Red eye.”—Be sure patients understand they are to remove both lenses and see you at once if they develop a red eye. Treat red eye as an infection until proven otherwise.

Scheduling evaluations.—With daily wear patients, most practitioners are accustomed to scheduling progress evaluations in the afternoon. This ensures that the lenses have been worn several hours by the time the patient is examined and any physiological response to lens wear can then be easily seen.

You should schedule evaluations of extended wear patients for the morning. This will let you determine whether the phenomena which occur at the moment the eye opens upon awakening have cleared up, as they should, within the first hour of open-eye wear.

For example, if a patient still has debris behind the lens four hours after he awakens, you may well anticipate that he will eventually have a “red eye” response. You should adjust your fitting parameters to provide greater lens movement.

Conclusion

After reviewing all the physiological responses to cosmetic extended wear, you'll probably agree that contact lenses can be worn safely for extended periods. But you'll probably agree, too, that they should be worn and monitored carefully to prevent adverse physiological changes. ■

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TABLE 3

Appearance of eye wearing extended wear lens when observed at eye opening

Vascular hyperemia
Dense striae and folds
Mucus strands
Lens dry and sticky
Lens fits tightly
Posterior lens debris

TABLE 4

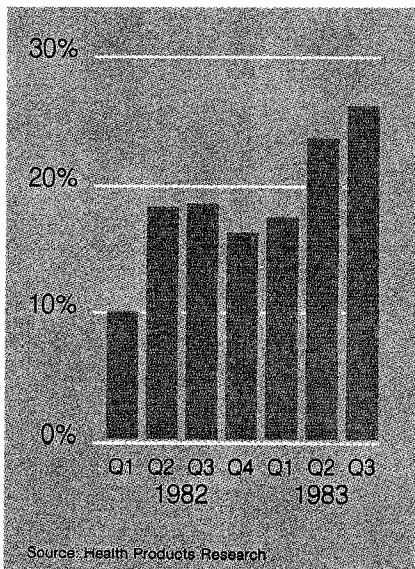
Patient education

<i>Patient must remember to check each morning that:</i>
FEEL GOOD The patient's eyes must feel good when he blinks six or eight times in the morning.
LOOK GOOD The patient's eyes should look good when viewed in the mirror. The patient should look for redness and mucus excretions.
SEE WELL The patient should see well when he alternately covers his eyes to check v.a. at the distance for which the lenses were prescribed.
Source: Yamane

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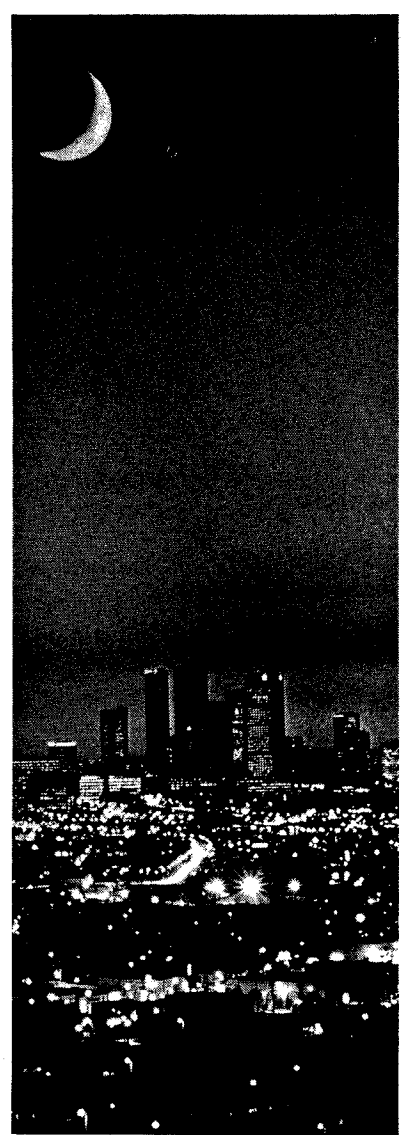
FIGURE 1
Extended wear as a proportion of new fittings



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