

## How punctal occlusion improves multifocal IOL satisfaction

Two cases illustrate benefits in managing dry eye before, after surgery with implantation

By Craig F. McCabe, MD, PhD, FACS, and Shannon E. McCabe, BSC, Special to Ophthalmology Times

**PATIENTS UNDERGOING CATARACT** surgery who choose multifocal or other premium IOLs have high expectations that are quite similar to those of younger patients undergoing LASIK. In order to meet those expectations, it is imperative to treat dry eye disease before and after surgery.

Dry eye disease is strongly correlated with age, so ophthalmologists can expect a relatively high incidence in a cataract surgery population. Even in patients with no history of dry eye complaints, the condition is very common after cataract surgery.<sup>1</sup> Post-surgical dry eye may be due to pre-existing subclinical dryness, ocular surface irritation caused by topical anesthesia and preservatives in eye drops used during surgery, and/or the disruption in corneal innervation from surgical incisions.<sup>2</sup>

Regardless of the cause, evidence suggests that ocular surface disease has a significant effect on patient satisfaction following corneal or lens refractive surgery.<sup>3,4</sup> A suboptimal tear film may lead to an increase in total and higher-order aberrations and, consequently, a reduction in retinal image quality.<sup>5,6</sup>

Dry eye can also affect the accuracy of preoperative keratometry and topography. Interestingly, it has been reported that 50% to 60% of patients with cataracts have significantly abnormal tear break-up time and central corneal staining, despite being asymptomatic.<sup>7</sup>

If surgeons miss treating dry eye in these patients, the likelihood of selecting the incorrect IOL power or the wrong axis for placement of a toric IOL or corneal relaxing incision (CRI) increases.

Although one might consider treating dry eye with steroids or cyclosporine, punctal occlusion can be a useful modality for patients with cataracts. In this age group, dry eye often results from a permanent decrease in lacrimal gland aqueous production secondary to fibroblast infiltration causing parenchymal destruction.<sup>8</sup> Thus, patients with cataracts may have an inflamed dry eye as a symptom of their dry ocular surface from an age-related decrease in the tear film's aqueous component, rather than from a primary inflammatory disease.

Two recent cases in which punctal occlusion was beneficial to patients with multifocal IOL illustrate the importance of addressing dry eye both preoperatively and post-operatively. In both of these cases, a trial of artificial tears had failed. Punctal occluders (Parasol Punctal Occluders, BVI-Odyssey) were inserted in the lower puncta of each of these patients.

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### take-home

► Patients undergoing cataract surgery who choose multifocal or other premium IOLs have high expectations. It is imperative to treat dry eye disease before and after surgery.

### CASE 1

A 75-year-old white female was referred for progressive vision loss and red eyes. She complained of glare and difficulty driving at night as well as painful, gritty eyes. These problems forced her

to cut back on activities she enjoyed, and she wanted to “get her life back.”

Her exam demonstrated a decreased tear meniscus, 2+ inferior corneal punctate epithelial erosions, and a 3+ nuclear sclerotic cataract OU. The lid margin was normal. A scan (Nidek OPD-Scan, Marco) of her left eye revealed a placido image with the characteristic dull corneal light reflex and wavy, irregular mires, especially inferiorly, of a dry ocular surface (Figure 1).

Six weeks after punctal occlusion, her dry eye symptoms were greatly improved. Compared with the first scan, there was a noticeable improvement in the placido image of the axial map (Figure 2). Also, spherical aberration decreased significantly from 0.241 to 0.136  $\mu\text{m}$ . Lastly, the K-values changed from 42.61/43.27 @ 41° to 42.88/43.72 @ 53° (a difference in average K of 0.36 D and in axis of 12°) and 0.8 D increase in average pupil power.

In both eyes, dry eye treatment resulted in a 0.5-D change in the IOL power selected to achieve a plano result (Table 1). It also revealed that her corneal astigmatism was significant enough to warrant CRIs.

One month after cataract surgery with a multifocal IOL and CRIs, her uncorrected visual acuity (UCVA) OS was 20/20 and J1+ with a manifest refraction of  $-0.25 + 0.25 \times 006^\circ$ . She was very satisfied with her new vision and enthusiastically looked forward to having surgery on her right eye.

Had we based the surgical plan on initial data

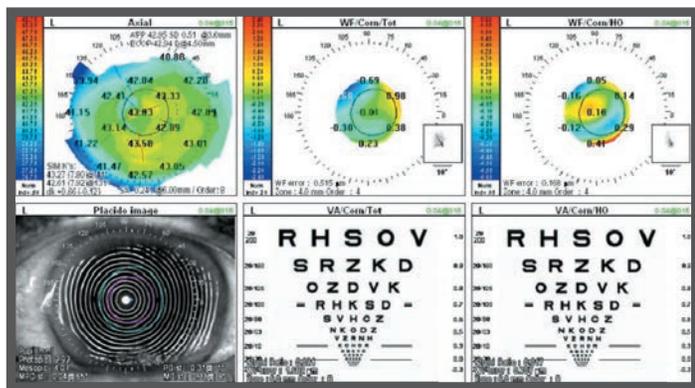


Figure 1. NIDEK OPD-Scan of the left cornea before punctal plug therapy

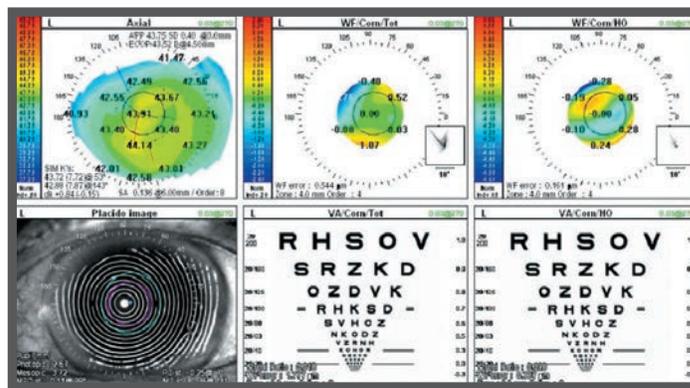


Figure 2. Preoperative NIDEK OPD-Scan after punctal plug therapy

without the benefit of punctal occlusion, the patient would likely have ended up with a manifest refraction of  $-0.75 +0.75 \times 045$  at best. Thus, preoperative treatment can mean the difference between needing to perform an enhancement procedure on an unsatisfied patient and having a very satisfied patient with a premium lens.

### CASE 2

A 65-year-old white female presented 1 week after uncomplicated cataract surgery with a multifocal IOL (Tecnis Multifocal IOL, Abbott Medical Optics) in the left eye. She complained that the eye felt “sandy” and that her vision had worsened after postoperative day 1. Her manifest refraction was  $-0.50 +1.50 \times 175^\circ$  yielding UCVA of 20/50 and J3. Postoperative dry eye and irregular astigmatism were diagnosed (Figure 3). A punctal plug was easily inserted into her left lower eyelid, and the potential need for corneal relaxing incisions was discussed.

One month later, UCVA had improved to 20/25 and J1. Her MR was  $-0.25 +0.75 \times 178^\circ$ , and the ocular foreign body sensation had resolved. The total wavefront error improved from 1.089 to 0.580  $\mu\text{m}$ , while the root mean square (RMS) for a 3-mm pupil improved from 0.93 to 0.31 D, corresponding to a much sharper and more regular placido image (Figure 4).

Three months later, she was offered the option of a small CRI that further improved her UCVA to 20/20 and J1+, residual MR to  $+0.25$  D sphere, total wavefront error to 0.349  $\mu\text{m}$ , and RMS to 0.22 D.

### PATIENT SATISFACTION

In this case, treatment of postoperative dry eye using punctal occlusion turned an unhappy patient with a multifocal IOL into a happy one. The improvement in her refraction with treatment demonstrates the importance of optimizing the ocular surface before performing costly and/or invasive corrective procedures that may further stress an already compromised ocular surface.

Ultimately, the goal of multifocal lens implantation is patient satisfaction with the visual outcome. Punctal occlusion before and after premium IOL surgery is a fast, safe, effective, and affordable treatment to improve both patient and physician satisfaction greatly. ■

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## OD Formula: Holladay II OS

**Alcon SN6AD1**  
Procedure: **Std Phaco**  
MFG ACD(US): **5.49**

IOL	Pred.Ref.
24.00	0.25
24.50	-0.09
<b>24.51</b>	<b>-0.10</b>
25.00	-0.44
25.50	-0.80

**Alcon SN6AD1**  
Procedure: **Std Phaco**  
MFG ACD(US): **5.49**

IOL	Pred.Ref.
23.50	0.30
24.00	-0.04
<b>24.09</b>	<b>-0.10</b>
24.50	-0.39
25.00	-0.74

## OD Formula: Holladay II OS

**Alcon SN6AD1**  
Procedure: **Std Phaco**  
MFG ACD(US): **5.49**

IOL	Pred.Ref.
23.00	0.53
23.50	0.19
<b>23.92</b>	<b>-0.10</b>
24.00	-0.15
24.50	-0.50

**Alcon SN6AD1**  
Procedure: **Std Phaco**  
MFG ACD(US): **5.49**

IOL	Pred.Ref.
23.00	0.37
23.50	0.03
<b>23.68</b>	<b>-0.10</b>
24.00	-0.32
24.50	-0.67

Table 1. Holladay II printout before and after punctal plug therapy



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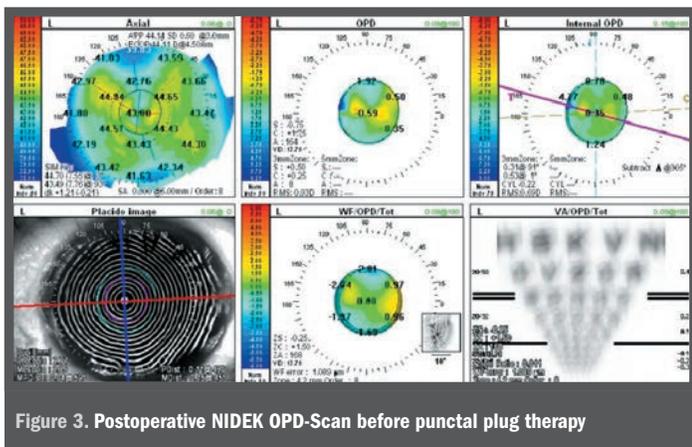


Figure 3. Postoperative NIDEK OPD-Scan before punctal plug therapy

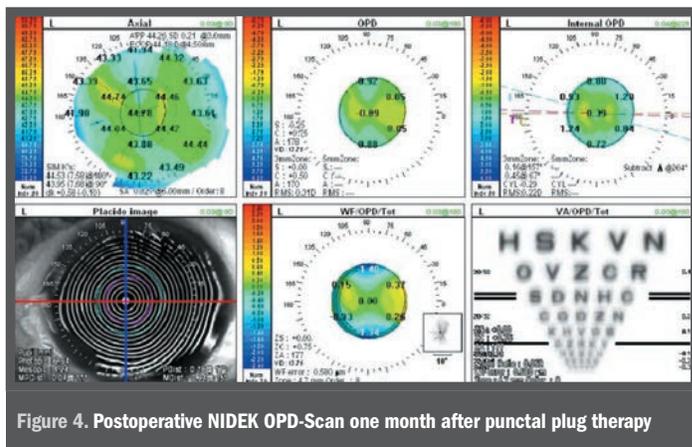


Figure 4. Postoperative NIDEK OPD-Scan one month after punctal plug therapy