

A Complex Case Management System Provides Optimal Care for All Patients

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ABSTRACT

PURPOSE: To describe the complex case management system developed by Optical Express, a large corporate provider of laser vision correction, and to detail the benefits this system offers for managing the surgical complications of laser vision correction.

METHODS: The classification scheme Optical Express uses to categorize surgical complications is described, and the various pathways patients can take through the complex case system are detailed. This process is illustrated with a case study describing the treatment of a patient with postoperative LASIK ectasia. The benefits of the complex case system are also discussed.

RESULTS: A total of 1363 eyes were treated in the complex case management system during the 5-year period between January 1, 2004 and December 31, 2008. These 1363 eyes represent a small fraction (0.45%) of the approximately 300,000 eyes treated during this period. The Optical Express complex case management system organizes complications based on severity and urgency. Grade A complications (40 eyes, 2.9% of all complications) are the most serious and urgent, followed by grade B (327 eyes, 24.0%), and grade C (996 eyes, 73.1%). For each complication, the patient's journey through the complex case system starts with an evaluation by an optometrist. Depending on the severity of the complication, the patient may then be referred to the treating surgeon, a regional complex case surgeon, or an external consultant. A complex case manager coordinates care and logistics throughout this process.

CONCLUSIONS: The complex case management system used by Optical Express provides clinical care and support for patients who experience a surgical complication. [*J Refract Surg.* 2009;25:S655-S660.] doi:10.3928/1081597X-20090611-06

Significant complications following laser vision correction occur in <1% of patients, but the quality of care provided in these cases can define the way surgeons and their practices are perceived. With proper management and excellent communication, most complications can be resolved with minimal or no loss of vision or patient dissatisfaction. When a complication is managed poorly, however, a single unhappy patient can significantly damage a practice's reputation. On a larger scale, a small cadre of dissatisfied refractive surgery patients can negatively influence public perception of the entire industry.

Because effective complication management is essential for quality patient care, Optical Express has developed a complex case management system dedicated to treating patients who experience a complication. Staffed by highly trained clinicians and support personnel, equipped with state-of-the-art of technology, and supported by the expertise of the company's International Medical Advisory Board (IMAB), this system provides the resources necessary to ensure appropriate and timely treatment for any potential complication.

CATEGORIZING COMPLEX CASES

Complications after laser vision correction can range from minor ocular surface irritation to potentially blinding conditions that require immediate treatment. Because long-term outcomes often hinge on the appropriateness and timeliness of initial treatment, the complex case management system provides resources to help optometrists and surgeons assess the urgency of each patient's condition. Central to this effort is a standardized classification scheme that categorizes com-

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TABLE

Classification Scheme of the Complex Case Management System

| Grade | Complication | Examples |
|----------------------|--|---|
| Grade A - Emergency | Visually disabling conditions that require immediate management. The risk of disability increases rapidly with time. | <ul style="list-style-type: none"> • Microbial keratitis • Severe DLK • Displaced flap • Retinal detachment • Flat anterior chamber/wound leak • Pupillary block glaucoma (IOP >30 mmHg) |
| Grade B - Urgent | Visually disabling conditions that require urgent management (within 2 to 3 days). | <ul style="list-style-type: none"> • Visually significant flap striae • Progressive epithelial ingrowth (visually significant or with flap melt) • Wound leak with formed anterior chamber • Displaced IOL • Visually significant cystoid macular edema • Loss of ≥ 2 lines BSCVA at 3 months or later due to a progressive condition |
| Grade C - Not Urgent | Other non-emergency and nonprogressive visually disabling conditions, or symptoms that cannot be managed by local optometrist and are not due to conditions listed in categories A or B. | <ul style="list-style-type: none"> • Quality or clarity of vision symptoms, such as glare, halos, and/or difficulty driving, at 3 months or later • Decrease in BSCVA of ≥ 2 lines at 3 months or later • Unsatisfactory refractive or visual outcome • Severe dry eye complaints and/or persistent punctate epithelial erosions not responsive to conventional treatment • Other nonprogressive ocular or visual conditions or symptoms |

DLK = diffuse lamellar keratitis, IOP = intraocular pressure, IOL = intraocular lens, BSCVA = best spectacle-corrected visual acuity

plications by their severity and the timeframe in which they should be treated (Table).

By helping to ensure that complications are addressed with the appropriate urgency, this classification scheme can be a useful tool for guiding clinical management. Because the complex case management system deals with any complication experienced by an Optical Express patient, not just refractive surgery complications, this scheme includes a wide range of postoperative complications.

Although all complications require careful treatment, the majority of complications are not vision threatening. Of the complications treated in the Optical Express complex case management system, 2.9% (0.01% of all eyes [N=300,000]) were categorized as grade A conditions. Twenty-four percent of complex cases (0.11% of all eyes [N=300,000]) were categorized as grade B and 73.1% of complex cases (0.33% of all eyes [N=300,000]) were grade C. The most common reasons for referral to the complex case management system are dry eyes that affect vision, residual myopia following laser vision correction, and overall patient dissatisfaction (Fig 1).

TREATMENT OF COMPLEX CASES

In addition to providing guidance that helps clinicians evaluate the severity of various complications, the complex case management system also offers a range of resources to treat these cases. Not only does

this system ensure that patients receive care from expert clinicians, it also makes available complex case managers who communicate with the patient and the responsible clinicians on a regular basis, facilitate referrals, make appointments, and arrange transportation and accommodation as needed. These individuals provide a communication and logistics link that is important to the system and the patient.

Because each case is unique, the complex case management system offers multiple treatment pathways (Fig 2). Although the patient's initial contact is generally an optometrist, the patient may subsequently be referred to either the treating surgeon, a surgeon who specializes in complication management, or an expert consultant outside of the Optical Express system.

When a patient presents with a problem, the optometrist first performs an evaluation and makes an initial assessment. If the problem is straightforward and falls within the scope of optometric practice, the optometrist provides appropriate treatment. For example, a patient who has postoperative dry eye complaints after LASIK (with an otherwise normal examination) can often be managed successfully with standard dry eye therapies.

For more complex problems that may require advanced medical or even surgical management, the optometrist refers the patient to the treating surgeon and notifies a complex case manager about the case.

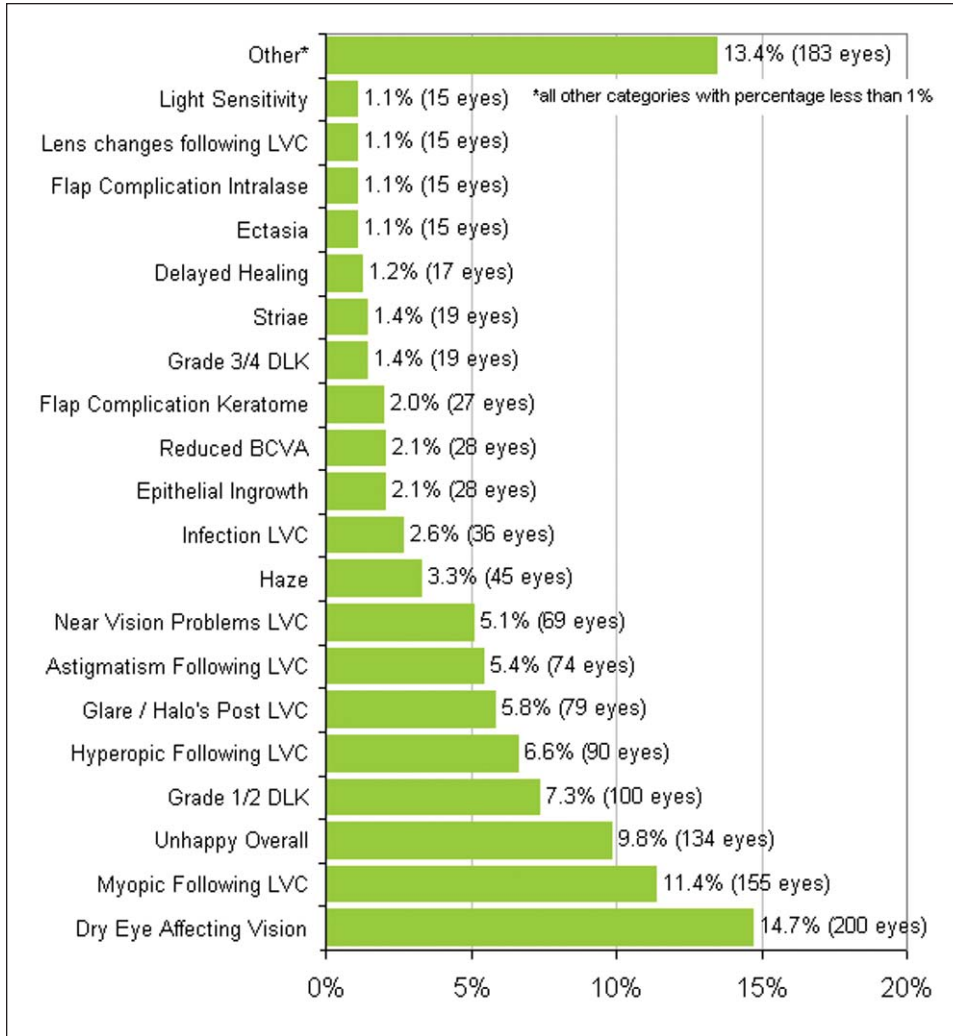


Figure 1. Patients are referred to the complex case management system for a variety of reasons, including postoperative dry eye, residual myopia, and overall patient dissatisfaction (N=1363 eyes). LVC = laser vision correction, DLK = diffuse lamellar keratitis, BCVA = best spectacle-corrected visual acuity

Because multiple clinicians may become involved in providing care for complex cases, the complex case manager serves as a communication link between the patient and the clinicians involved in the case. The complex case manager tracks and records the relevant details of every case and oversees all of the logistics related to the patient's care.

The treating surgeon then evaluates the patient and either treats the patient personally or refers the patient to an appropriate sub-specialist. In most cases, the treating surgeon provides the necessary treatment. For example, a patient with visually significant flap striae could be treated by relieving and repositioning the flap.

In some circumstances, the surgeon may need to refer the patient to a regional complex case surgeon. These individuals specialize in managing rare complications, such as ectasia after laser vision correction, and they have access to equipment and resources that are not available at every laser center. For example, these individuals can use specialized diagnostic in-

struments such as anterior segment optical coherence tomography to perform a more in-depth examination of a patient, and they also have the resources to perform advanced surgical procedures such as collagen cross-linking, premium intraocular lens implantation, or topography-guided laser retreatment.

Alternatively, if the treating surgeon believes that the case is particularly serious or falls outside his or her areas of expertise, he or she may immediately refer the patient to an external consultant. For example, a patient with a macula-off retinal detachment may need immediate care by a retina specialist. The complex case management system has consulting arrangements in place to facilitate such outside referrals.

Once the complication has been stabilized or resolved, the patient is referred back to the normal Optical Express system for any remaining follow-up care. Although the patient is now back in the regular patient care system, the optometrist and surgeon remain in regular contact with each other and with the complex case manager.

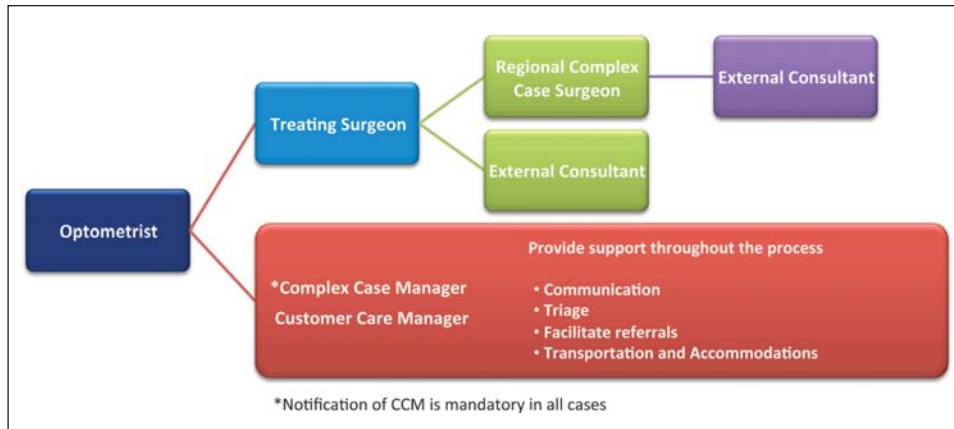


Figure 2. Depending on the severity of the complication, patients referred to the complex case system may receive care from an optometrist, the treating surgeon, a regional complex case surgeon, or an external consultant.

Throughout this process, communication takes place in many ways. The complex case manager is available through a direct telephone link as well as an internal e-mail system that can be accessed by all optometrists and surgeons. The medical director and the complex case manager also discuss new and existing cases in detail during telephone conference calls that take place on a weekly basis. A summary report is composed by the complex case manager ahead of this weekly conference call.

CASE STUDY: A PATIENT WITH ECTASIA AFTER LASIK

To see how the complex case management system works in practice, the following case study is presented. Note that the care provided by the complex case management system allowed the patient to ultimately achieve a good outcome, even after experiencing a serious complication.

A 34-year-old man underwent uneventful bilateral LASIK in May 2006. The patient’s medical, ocular, and family history was unremarkable. The preoperative manifest refraction was $-3.00 -1.75 \times 095$ with a best spectacle-corrected visual acuity (BSCVA) of 20/15 in the right eye and $-4.75 -2.00 \times 095$ with a BSCVA of 20/15 in the left eye. Over 2 years of documentation confirmed refractive stability.

Keratometry was 43.50/45.50 diopters [D] @ 010 in the right eye and 45.00/46.50 D @ 176 in the left eye. The preoperative corneal shape (Orbscan; Bausch & Lomb, Rochester, NY) was assessed to be normal in both eyes. Ultrasound pachymetry measured corneal thickness as 563 μm in the right eye and 560 μm in the left eye.

The IntraLase FS-60 (Abbott Medical Optics [AMO]; Santa Ana, Calif) was used to create a 9.0-mm diameter flap with a planned flap thickness of 120 μm in both eyes. A standard ablation treatment was performed with a VISX S4 IR excimer laser (AMO); the maximum ablation depth was 57 μm in the right eye and 81 μm

in the left eye. Based on this ablation depth and the preoperative corneal thickness measurements, the estimated residual stromal bed thickness was 383 μm in the right eye and 362 μm in the left eye.

The patient had a normal postoperative recovery with follow-up care provided at standard intervals by the patient’s local Optical Express optometrist. At 12-month postoperative follow-up, an increase in astigmatism was noted in both eyes. A reduction in uncorrected visual acuity (UCVA) and a slight reduction in BSCVA were also observed in the left eye. At this examination, the UCVA was 20/20 in the right eye and 20/60 in the left eye. The manifest refraction was $+0.75 -2.00 \times 050$ with a BSCVA of 20/12⁻² in the right eye and $+0.25 -2.50 \times 130$ with a BSCVA of 20/20⁺¹ in the left eye.

Suspecting ectasia, the optometrist referred the patient back to the treating surgeon and notified the complex case manager. The surgeon confirmed the diagnosis of postoperative LASIK ectasia, worse in the left eye than the right eye (Fig 3). The patient was referred into the complex case system for further management.

As the first step in managing this complication, the complex case manager discussed the case with both the referring surgeon and complex case surgeon. The complex case manager assigned to this patient was an optometrist with many years of experience managing complex refractive surgery patients, and the complex case surgeon was an experienced refractive and intraocular surgeon with expertise in the tertiary management of corneal diseases, including ectasia after laser vision correction.

After a full discussion of the patient’s condition and the proposed treatment plan, the complex case manager contacted the patient. In addition to arranging an initial appointment with a specialist surgeon, the complex case manager used this opportunity to reassure the patient, answer any questions the patient might have had, and provide e-mail and mobile phone contact information in case the patient had any questions between clinical

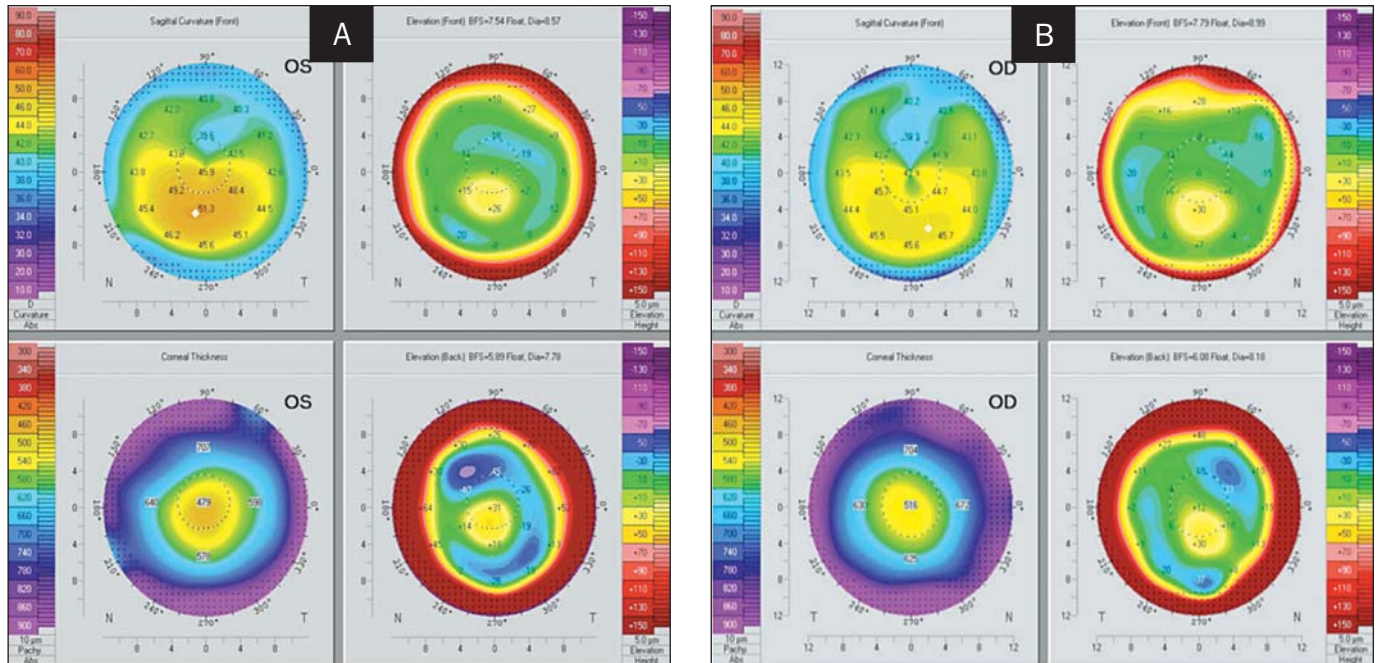


Figure 3. In this case, Pentacam (Oculus Optikgeräte, Wetzlar, Germany) images taken 1 year after LASIK revealed ectasia that was worse in the **A**) left eye than the **B**) right eye. In the left eye, the sagittal curvature map shows an 11.00-D difference in superior-inferior K readings, as well as an abnormal K reading (51.30 D). The abnormal anterior elevation map (apex +32 μm) corresponds with the abnormal posterior elevation map (apex +49 μm). The thinnest point on the pachymetry map is 466 μm . In the right eye, the superior-inferior difference in K readings is 6.00 D, with the anterior elevation map showing an apex +31 μm and the posterior elevation map showing an apex +36 μm . The thinnest point on the pachymetry map is 512 μm .

appointments. For patients with a complicated postoperative course who are likely to be apprehensive, this immediate attention, support, and reassurance may be as important as the clinical care rendered.

After entering the complex case management system, the patient was followed closely by the complex case manager and the patient management team for a period of 3 months, during which time the inferior steepening and astigmatism in the left eye progressed. In October 2007, the refraction in the left eye was plano -4.00×103 with UCVA of 20/80 and BSCVA of 20/25. To halt further progression, a collagen cross-linking procedure was performed in the left eye 17 months after the primary LASIK procedure.¹⁻³

Over the ensuing year, close follow-up care was provided by the complex case team and the patient's local optometrist. Residual refractive error in both eyes was managed with spectacles and contact lenses. No further progression of ectasia was noted in the left eye, and BSCVA improved to 20/20.

In December 2008, 14 months after the collagen cross-linking procedure, the complex case surgeon corrected the residual refractive error of plano -4.25×085 by implanting an Artisan toric lens (Ophtec BV, Groningen, Netherlands).⁴⁻⁷ The patient noticed immediate visual improvement, and UCVA was 20/32 on the first postop-

erative examination following lens implantation. Two months after phakic IOL implantation, the left eye had achieved UCVA of 20/20, with a manifest refraction of $+0.25 -1.25 \times 140$ and BSCVA of 20/15.

As of this writing, this patient is continuing to receive follow-up care by his local optometrist. The optometrist regularly reports the patient's progress to the complex case team, and the complex case manager maintains regular communication with the patient. Because the right eye is also showing signs of progressive postoperative LASIK ectasia, a second collagen cross-linking procedure is planned.

BENEFITS OF THE COMPLEX CASE SYSTEM

As this example shows, the complex case management system quickly and effectively provides the appropriate level of care for each patient and ensures that the patient is tracked and followed until the complication has been resolved. Although the effective and rapid provision of clinical care is the most obvious element of this system—and arguably, the most important—this system also provides other important benefits.

By offering a detailed and well-coordinated protocol for continuous communication between the patient, clinical providers, and complex case manager, this system ensures that patients believe they are receiving ap-

appropriate attention and the best possible care for their condition. Given that these patients are likely to be anxious, this dedicated communication is a key element in maintaining patient satisfaction. In fact, many of these patients become ambassadors for the practice following completion of their care, regardless of their complication, because of the care and attention they received.

AUTHOR CONTRIBUTIONS

Study concept and design (J.A.V., S.J.H.); data collection (S.J.H.); interpretation and analysis of data (J.A.V.); drafting of the manuscript (S.J.H.); critical revision of the manuscript (J.A.V.); administrative, technical, or material support (S.J.H.); supervision (J.A.V.)

REFERENCES

1. Hafezi F, Kanellopoulos J, Wiltfang R, Seiler T. Corneal collagen crosslinking with riboflavin and ultraviolet A to treat induced keratectasia after laser in situ keratomileusis. *J Cataract Refract Surg.* 2007;33:2035-2040.
2. Wittig-Silva C, Whiting M, Lamoureux E, Lindsay RG, Sullivan LJ, Snibson GR. A randomized controlled trial of corneal collagen cross-linking in progressive keratoconus: preliminary results. *J Refract Surg.* 2008;24:S720-S725.
3. Coskunseven E, Jankov M, Hafezi F. Contralateral eye study of corneal collagen cross-linking with riboflavin and UVA irradiation in patients with keratoconus. *J Refract Surg.* 2009;25:371-376.
4. Budo C, Bartels MC, van Rij G. Implantation of Artisan toric phakic intraocular lenses for the correction of astigmatism and spherical errors in patients with keratoconus. *J Refract Surg.* 2005;21:218-222.
5. Moshirfar M, Grégoire FJ, Mirzaian G, Whitehead GF, Kang PC. Use of Verisyse iris-supported phakic intraocular lens for myopia in keratoconic patients. *J Cataract Refract Surg.* 2006;32:1227-1232.
6. Kamiya K, Shimizu K, Ando W, Asato Y, Fujisawa T. Phakic toric Implantable Collamer Lens implantation for the correction of high myopic astigmatism in eyes with keratoconus. *J Refract Surg.* 2008;24:840-842.
7. Alfonso JF, Palacios A, Montés-Micó R. Myopic phakic STAAR collamer posterior chamber intraocular lenses for keratoconus. *J Refract Surg.* 2008;24:867-874.