

ABSTRACT

Objective To quantify the effect of Rose K2 semi-scleral contact lenses (Menicon Co. Ltd., Nagoya, Japan) on corneal higher order aberrations (HOA) in a patient with post Laser assisted in situ keratomileusis LASIK ectasia.

Methods A 27-year-old female complained of distorted images after undergoing LASIK. A wavefront aberrometer detected HOAs (trefoil, point spread function (PSF) and modulation transfer function (MTF)) besides a significant cylindrical error. Her corrected distance visual acuity was 20/400 in the right eye and 20/200 in the left eye. She was fitted with mini scleral lenses in an attempt to improve the HOA.

Results Her visual acuity improved to 20/20 in both eyes and her visual symptoms resolved. HOA reduced from 3.152 to 0.490 and noted to be 0.440 at 6 months; trefoil also significantly improved (0.360 to 0.096; it was 0.031 at 6 months).

Conclusions Rose K2 semi-scleral contact lens can improve visual acuity and reduced both HOA and cylindrical power in patients with post LASIK ectasia.

INTRODUCTION

Laser assisted in situ keratomileusis (LASIK) using the excimer laser has been demonstrated to be safe and efficient for the correction of refractive errors.^{1,2} Though the risk of complications pertaining to laser ablation has greatly reduced, the inherent risks associated with the surgical procedure still remain.^{3,4} Postoperative ectasia is seen more commonly in patients with high myopia and low residual stromal bed thickness. Following refractive surgery, the development of keratectasia is due to mechanical instability as the corneal biomechanical strength is compromised.⁵

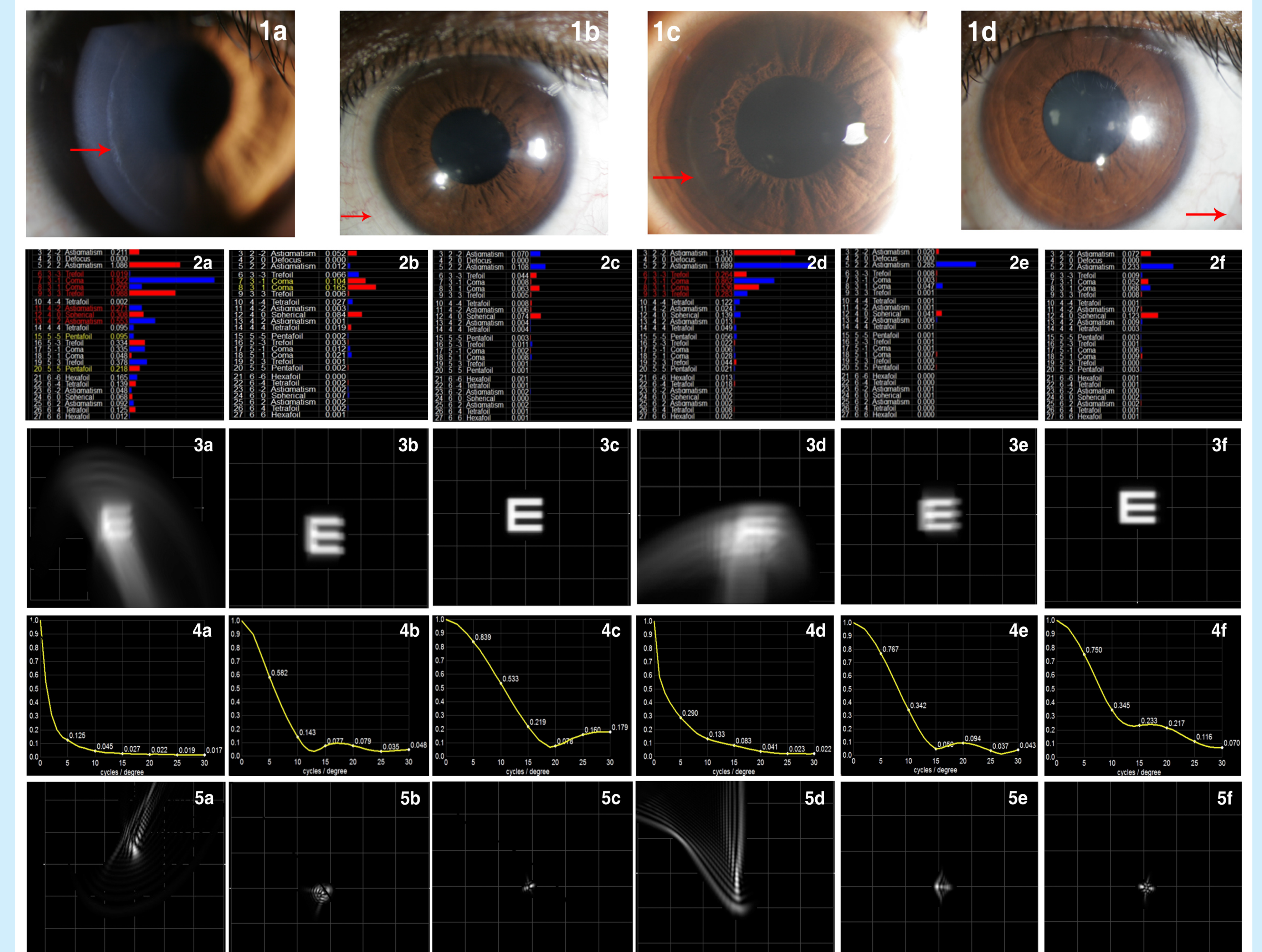
The Rose K2 semi-scleral contact lens (Menicon Co. Ltd., Nagoya, Japan) is a specially customized lenses, which has been used to correct irregular astigmatism, and higher order aberration in different corneal diseases. It has been available in 9 edge lift with toric design.⁶

This case report demonstrates a successful outcome of Rose K2 mini-scleral lens in improving the visual discomfort in a patient with an extremely thin and irregular cornea resulting from an excimer laser refractive surgery.

CASE REPORT

A 27-year-old lady presented with complaints of decreased vision in both eyes since the last four years. Her ocular history revealed that she had undergone LASIK surgery six years before in both eyes. The patient presented to us with ocular dryness and halos. Her corrected distance visual acuity (CDVA) was 20/400 in the right eye and 20/200 in the left eye. A detailed clinical examination and refraction ensued with investigations including corneal topography and aberrometry. The residual refractive error was -6.00/-8.00x20 in the right eye and -5.50/7.00x45 in the left eye. Ocular aberrometric analysis was performed with the iTrace system (Tracey Technologies Corp, Houston, TX). High order aberrations were noted amongst which trefoil and coma like aberrations were predominant (Figures 2a, 2d); the convolved Snellen charts, point spread function (PSF) and modulation transfer function (MTF) curves are shown in (Figures 3a, 4a, 5a). Based on the above findings, a diagnosis of corneal ectasia was made. To overcome the HOA and gross astigmatic changes, we gave a trial of mini scleral lenses in both eyes using Rose K2 semi-scleral contact lenses with a 7.50 base curve, -8.00 Diopter power and 14.60 mm diameter lens. On slit lamp evaluation, the fit was noted to be good with adequate centration, and edge clearance. After fitting with Rose K2 semi-scleral contact lenses, her CDVA improved to 20/20 in both eyes with a residual refractive error of plano/-0.75x114. Figures 2a, 2b, 2c and 2d, 2e, 2e demonstrate the Zernike's coefficient and RMS maps before and after scleral lens fitting and at 6 months follow-up. An improvement in optotype discrimination was noted in the Convolved Snellen's charts along with an increase in the area under the MTF curve (Figures 3b, 3c, 3e, 3f and 4b, 4c, 4e, 4f). There was also significant reduction in the oblique elongation in the PSF map (Fig 5b, 5c, 5e, 5f).

At the last follow-up six months later, the patient was still using her Rose K2 semi-scleral contact lenses. She reported no discomfort or poor visual symptoms and the fit remained good. There was no evidence of corneal neovascularization or edema.



Discussion

When all other treatment modalities fail, a vision-saving device is the use of Mini-Scleral lenses. Rose K2 semi-scleral contact lenses have better visual benefits, reduce visual symptoms, tolerate increased wearing hours, and improved quality of life. Though they are available in many different diameters and edge profile, the Rose K2 semi-scleral contact lenses work well with corneal irregularities. The back optic zone radius of the lens is also customizable.⁶

Rose K2 semi-scleral contact lenses in our patient significantly improved visual acuity and reduced visual discomfort. A decrease in the cylindrical power with reduced HOA, mainly coma and tilt, along with an improvement in PSF and MTF was found on objective assessment. There was also a reduction in dryness, ghosting of images and double vision after using these lenses.

Thus Rose K2 semi-scleral contact lenses can not only improve visual acuity by correcting both astigmatism and HOA, they can also offer better quality of vision in patients with post lasik ectasia. A longitudinal study on a large sample of post lasik ectasia patients would possibly validate our observations.

REFERENCES

1. Maldonado MJ, Nieto JC, Piñero DP. Advances in technologies for laser assisted in situ keratomileusis (LASIK) surgery. Expert Rev Med Devices 2008;5:209-229.
2. Sakimoto T, Rosenblatt MI, Azar DT. Laser eye surgery for refractive errors. Lancet 2006;367:1432-1447.
3. Maldonado MJ, Nieto JC, Piñero DP. Advances in technologies for laser-assisted in situ keratomileusis (LASIK) surgery. Expert Rev Med Devices 2008;5:209-229.
4. Sakimoto T, Rosenblatt MI, Azar DT. Laser eye surgery for refractive errors. Lancet 2006;367:1432-1447.
5. Seiler T, Koufala K, Richter G. Iatrogenic keratectasia after laser in situ keratomileusis. J Refract Surg 1998;14:312-7.
6. Romero-Jiménez M, Flores-Rodríguez P. Utility of a semi-scleral contact lens design in the management of the irregular cornea. Cont Lens Anterior Eye. 2013;36(3):146-50.