



Limbal stem cell deficiency as a consequence of chemical burn and its management using a scleral lens

Celia R Gong, OD, MS; Pam Satjawatcharaphong, OD, FAAO, FSLs
University of California, Berkeley, School of Optometry



Introduction

- Healthy corneal tissue is maintained by the continual regeneration of corneal epithelial cells.
- Disruption of the limbal niche or damage to limbal stem cells result in limbal stem cell deficiency (LSCD) or dysfunction.
- Scleral lenses are large diameter gas permeable lenses that offer a non-invasive method for managing LSCD or dysfunction.

Case Report

A 62 year-old Caucasian male with LSCD in the left eye was referred to the eye clinic for contact lens fitting.

Ocular history:

- Sulfur dioxide (acidic) burn 20+ years ago OD>OS
- Gunderson conjunctival flap surgery with resultant conjunctivalization OD (Figure 2)
- Limbal stem cell deficiency OS (Figure 3)

Ocular medication:

- Timolol 0.25% BID OD
- Cyclosporin A BID OS
- Fluorometholone 0.1% OS

Medical history:

- Unremarkable

Pentacam Scan

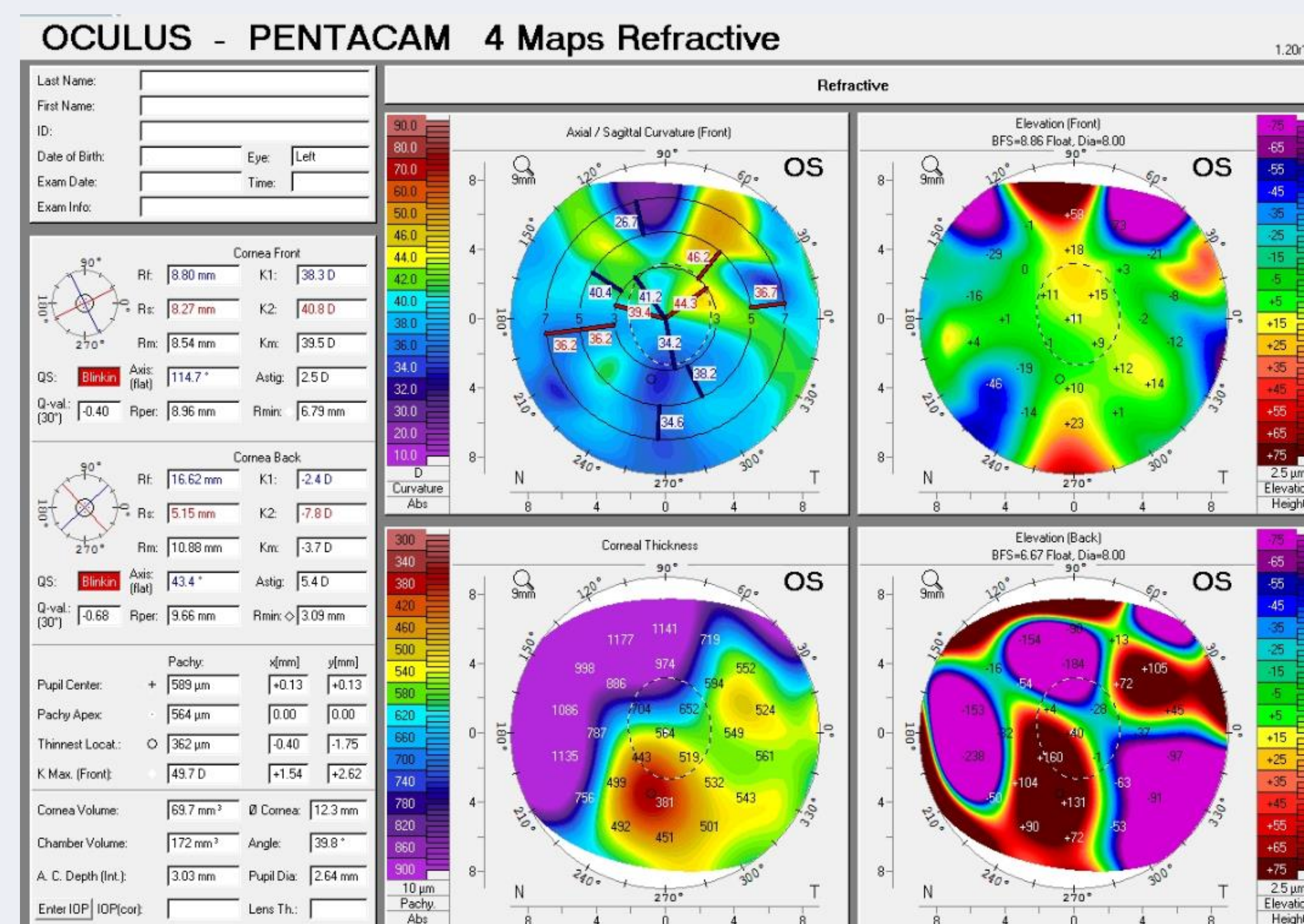


Fig 1. Pentacam scan (Oculus, Wetzlar, Germany)

Clinical Exam Findings

Visual Acuity:

OD: LP
OS: 20/15 with scleral

Confrontational Visual Fields:

OD: unable to perform
OS: full to finger counting

Anterior Segment Evaluation:

OD: See Figure 2
OS: See Figure 3

Refraction:

OD: unable
OS: poor subjective response

Pupils:

OD: no view of pupil
OS: reactive to light

Posterior Segment Evaluation:

OD: B-scan unremarkable
OS: unremarkable

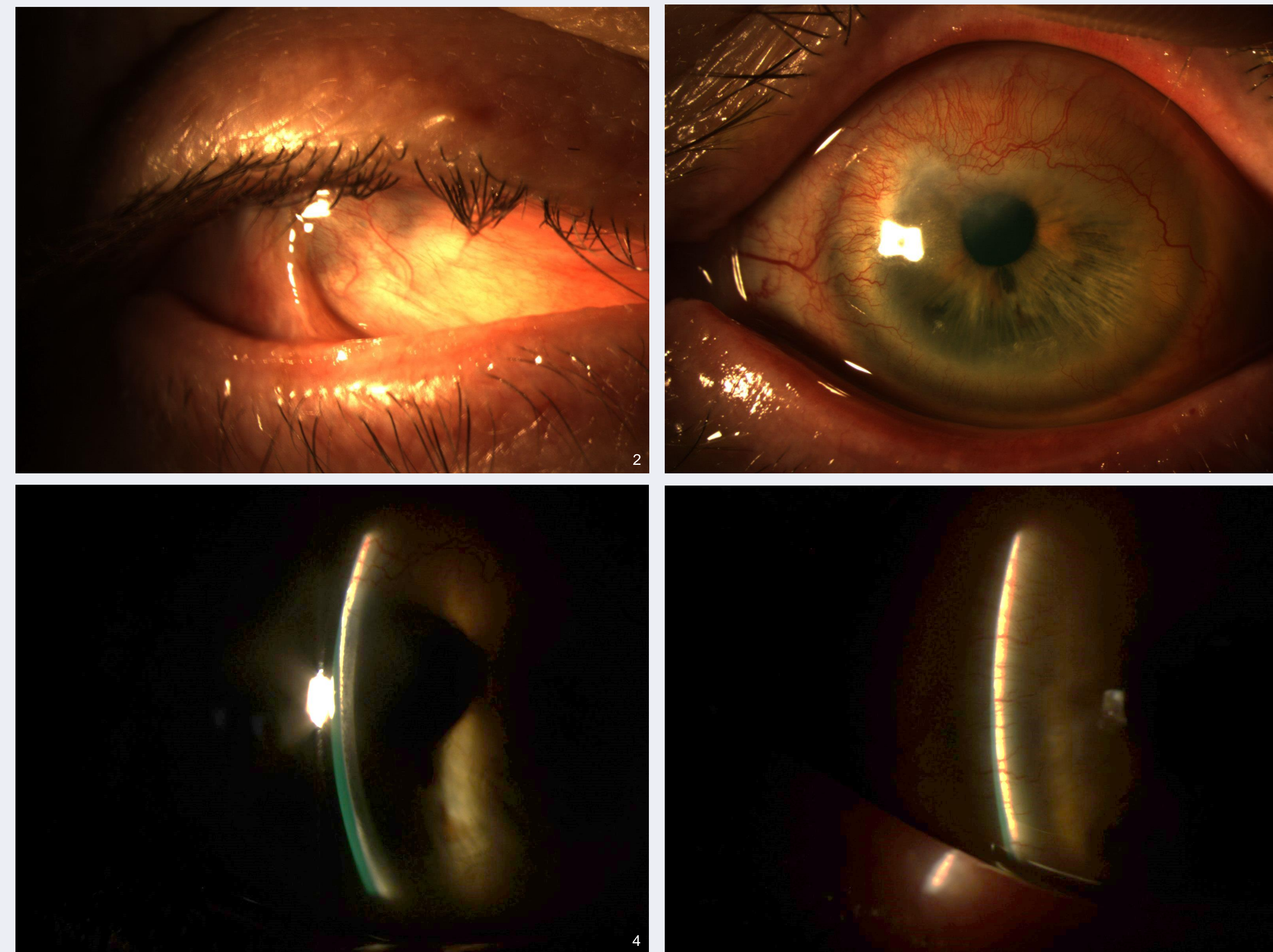


Fig 2. Right eye with inferior symblepharon; Fig 3. Left eye with peripheral conjunctivalization of cornea, sparing central cornea; Fig 4. Central clearance of scleral lens showing limbal touch superiorly over area of conjunctivalization; Fig 5. Nasal limbal clearance of scleral lens

Scleral lens evaluation:

BC	Power	Material	CT	Peripheral curves
7.34	-9.62 sph	Optimum Extra (Dk = 100)	0.50	6.75/2.5, 9.0/1.0, 12.25/1.7, 14.50/0.5

- Central clearance of 250 μ m
- Light tangential touch over area of conjunctivalization, limbal clearance elsewhere
- Scleral alignment without blanching
- Mild inferior decentration
- VA: 20/15-2

Discussion

LSCD or dysfunction can be congenital or acquired. Acquired forms may be due to Stevens-Johnson syndrome or chemical/thermal injury, among others¹. LSCD can result in **conjunctivalization** of the cornea, persistent epithelial defects, or corneal perforation, and ultimately lead to vision loss.

Non-surgical methods of managing LSCD or dysfunction include palliative care of the ocular surface², anti-inflammatory therapy², or other adjunctive therapy such as topical Vitamin A, autologous serum eye drops³, amniotic membrane⁴, and scleral lenses⁵. Depending on the severity of the condition, patients may require multiple interventions.

Scleral lenses are corrective lenses that land on the scleral and vault over the entire cornea and limbus⁶. These lenses offer several advantages when managing LSCD or dysfunction including:

1. The ability to provide constant lubrication of the ocular surface
2. The ability to optically neutralize irregular astigmatism
3. Protection of the limbal niche from shearing force of the lid

This patient was successfully fit into a scleral lens. He is being monitored closely for stability of his condition.

Clinical Pearls

- Conjunctivalization is the hallmark feature of LSCD.
- Optometrists can manage partial LSCD with treatment strategies that address ocular surface optimization.
- Scleral lenses should be considered as first-line management option for patients with LSCD.

References

1. Haagdoorens M, Van acker SI, Van gerwen V, et al. Limbal Stem Cell Deficiency: Current Treatment Options and Emerging Therapies. Stem Cells Int. 2016;2016:9798374.
2. Kim BY, Riaz KM, Bakhtiari P, et al. Medically reversible limbal stem cell disease: clinical features and management strategies. Ophthalmology. 2014;121(10):2053-8.
3. Rauz S, Saw VP. Serum eye drops, amniotic membrane and limbal epithelial stem cells--tools in the treatment of ocular surface disease. Cell Tissue Bank. 2010;11(1):13-27.
4. Pachigolla G, Prasher P, Di pascuale MA, Mcculley JP, Mchenry JG, Mootha VV. Evaluation of the role of ProKera in the management of ocular surface and orbital disorders. Eye Contact Lens. 2009;35(4):172-5.
5. Schornack MM. Limbal stem cell disease: management with scleral lenses. Clin Exp Optom. 2011;94(6):592-4.
6. van der Worp E. A Guide to Scleral Lens Fitting, Version 2.0 [monograph online]. Forest Grove, OR: Pacific University; 2015. Available from: <http://commons.pacificu.edu/mono/10/>.