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Scleral Lens Fit & the Conjunctiva

Key words: *Conjuctival blanching, Impression ring, Limbal congestion, Scleral lens fit*

Introduction

Scleral contact lenses are typically used to fit the most difficult irregular cornea patients or as a therapeutic device to manage severe ocular surface disease. The bearing force of these lenses rests on the scleral conjunctiva, which allows them to vault completely over the corneal surface. Scleral lenses are unique in that they semi-seal to the eye, and so a well fit lens does not move with blinking. This unique characteristic allows them to hold a large liquid reservoir that can mask extreme amounts of astigmatism for the irregular corneal patient or act as a liquid bandage to manage ocular surface disease. Blinking over the contact lens causes some flexure, which allows tear exchange as the lens acts like a diaphragm pump.

Conjunctival blanching

A well fit scleral lens will rest evenly on the scleral conjunctival surface without blanching of the conjunctival blood vessels (figure 1).

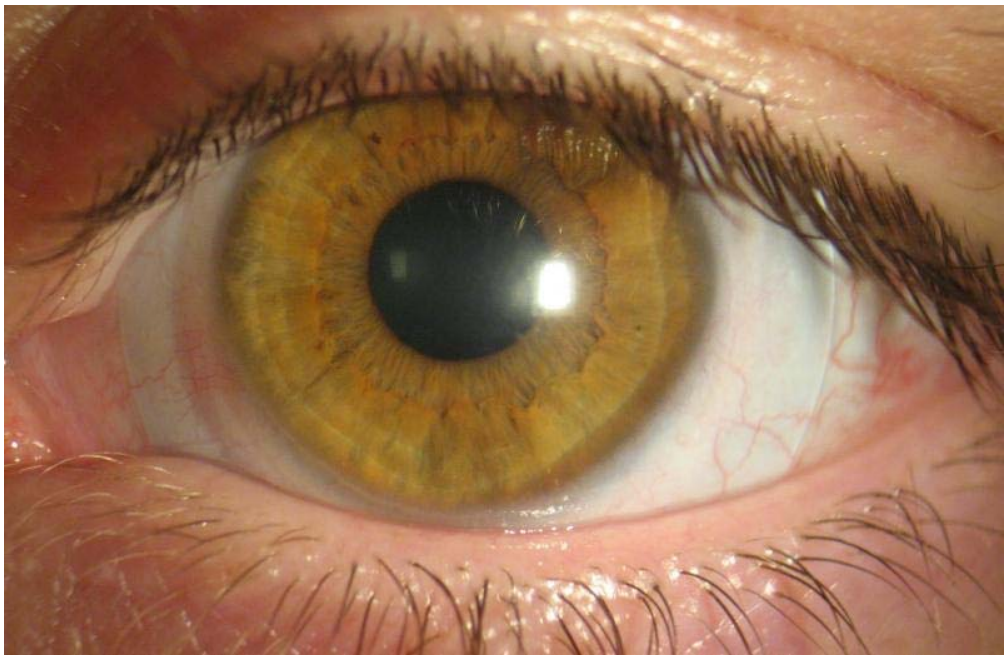

Figure 1

Because the scleral conjunctiva is spongy, scleral lenses may settle into this tissue and will leave an impression ring (figure 2) upon removal.

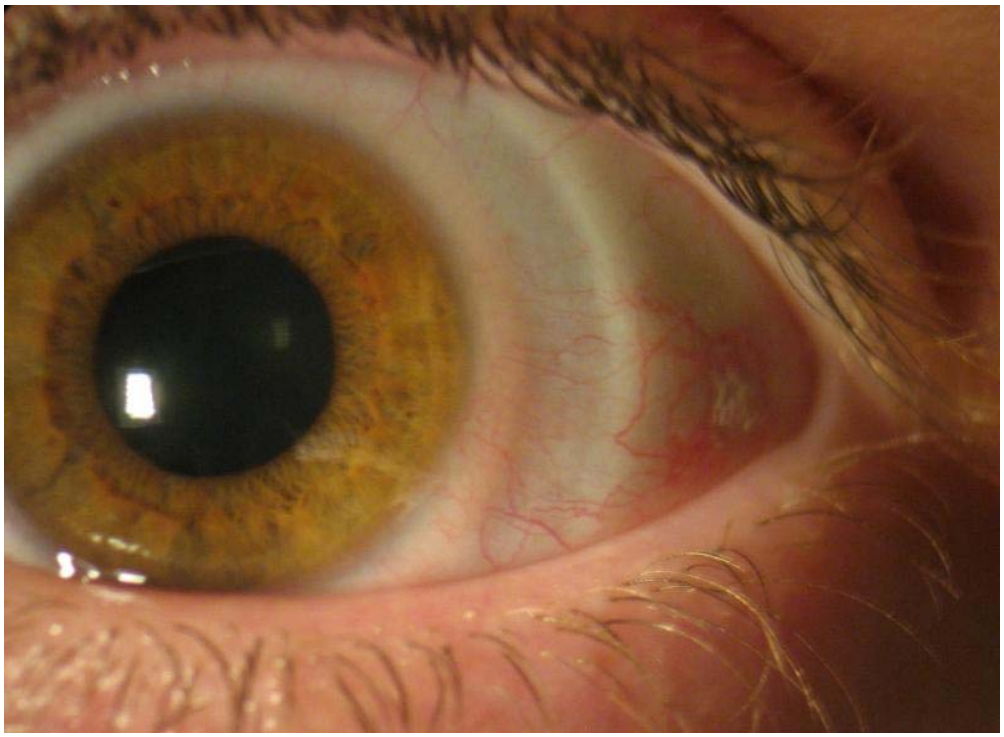

Figure 2

A scleral lens that fits too tight or perfectly to the eye will form a complete seal, which will be evident by excessive blanching and paralimbal congestion (figure 3).

Figure 3

The lens will no longer be able to exchange the liquid reservoir and the patient will be exposed to a toxic swamp that is trapped beneath the lens. In this situation, the patient's eye will become red and uncomfortable. A lens that seals and that is chronically worn can lead to neovascualization. This can be especially dangerous in patients who have undergone a corneal transplant, as this dramatically increases their risk of rejection[1].

Scleral lens parameter adjustments

The primary modification for a lens that seals is to flatten the peripheral curves of the scleral lens haptic to reduce tightness. An important note is that you need to start flattening at the peripheral curve that is inside or central to the corresponding area of blanching. If you start flattening the peripheral curves within the corresponding area of the lens where the blanching is occurring, you will actually make the seal-off worse. Essentially, this will lift the lens edge, causing the mid-peripheral haptic zone to pinch further into the sclera and the lens to fit tighter.

Toric designs

There is measurable evidence that the sclera not only has some toricity, but is asymmetric[2].

Interestingly, a back surface spherical scleral lens will create some mismatch when fit on a toric sclera, which will help to prevent the lens from completely sealing to the eye. However, it has been suggested in the literature that a back surface toric designed lens is more comfortable to wear [3,4,5]. Patients who have no initial complications with scleral lens wear can develop late onset seal-off from conjunctival congestion that causes the lens to fit significantly tighter. This congestion most likely develops from inflammation that is secondary to chronic mechanical interaction between the lens and scleral conjunctiva.

Sclerallens.org

This clinical article on scleral lens fitting was first published on the sclerallens.org website's forum where practitioners discuss topics like this one. Also, the website features many case reports and other educational resources. Please go to the sclerallens.org site to register for free access to all of the information. You can also find infomation on the site on how to become a Fellow of the organization.

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Gregory W. DeNaeyer is a 1998 graduate of The Ohio State University College of Optometry.

He completed a hospital based residency at the Columbus VA Medical Center. Gregory joined Arena Eye Surgeons in 1999 and is currently the Clinical Director.

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Currently his primary research is focused on profilometer designed scleral contact lenses, prosthetic scleral contact lenses, and novel materials and designs for therapeutic soft contact lenses. He has consulted for Medlens Innovations, Essilor, and Inspire Pharmaceuticals.

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