SPONSORED CONTENT

Welcome to this quarterly edition of reports sponsored by the Cornea, Contact Lenses, and Refractive Technologies (CCLRT) Section of the American Academy of Optometry.

AMERICAN ACADEMY of OPTOMETRY
SECTION ON CORNEA, CONTACT LENSES & REFRACTIVE TECHNOLOGIES

We hope you will find these reports informational and that you'll pick up some clinical pearls to utilize in your daily practices. We also hope that you get to know some of our featured Diplomate members who have already made the lifelong commitment to learning in this field. Additionally, we encourage every *Contact Lens Spectrum* reader to consider becoming a Diplomate of the CCLRT; clinician or researcher, we welcome your membership. **For further information: aaopt.org/CCLRT.**

—Randall Sakamoto, OD, PhD, FAAO
Diplomate, CCLRT

Prescribing Prosthetic and Therapeutic Colored Contact Lenses

BY MELANIE FROGOZO, OD
DIPLOMATE, CCLRT

Colored contact lenses have an important role as prosthetics for diseased and traumatized eyes. Prosthetic lenses improve the cosmetic appearance of patients who have ocular disfigurement or asymmetry. Additionally, these contact lenses can relieve patients who experience visual discomfort, such as diplopia[1] and photosensitivity.[2]

Several types of prosthetic contact lenses are available, each with their own unique features and limitations. Lens prescription is based on therapeutic need and cosmetic expectation. This article describes the various types of colored contact lenses that are available, and cases are used to illustrate the uses for these types of lenses.

THREE LENS TYPES

1. Translucent Soft Tinted Lenses

Translucent tinted lenses have a homogenous color throughout the tinted portion of the lens that overlaps the iris, thereby enhancing the natural tones. Translucent lenses are commonly used to augment the natural eye color or to cover mild disfigurements. An additional central feature can be added, such as a second translucent tint or a black pupil (Figure 1). The center can also be left transparent, giving a clear pupillary zone.

Figure 1. Translucent lens with pupil added.

2. Computer-Generated Soft Lenses

Computer-generated lenses are available in a variety of common iris color patterns and diameters. These lenses have good reproducibility and are less expensive compared with hand-painted lenses.

Computer-generated lenses achieve their desired iris appearance by layering several different color patterns by dot-matrix printing. An iris coloration pattern without an opaque underprint provides partial iris occlusion whereby some of the patients' natural eye features will be visible. In order to achieve full iris occlusion, an opaque underprint may be specified underneath the colored iris print. The final perceived iris color will vary depending on the color of the opaque underprint (Figure 2). An opaque backing will mask the natural color of the eye and any underlying irregularities.

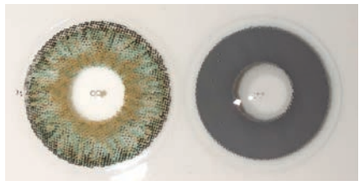

Figure 2. An opaque underprint (right) may be specified underneath the colored iris print of a computer-generated lens (left) in order to have full occlusion.

Some manufacturers offer diagnostic fitting sets that include iris enhancements, such as a limbal ring or pupillary frill. Preset designs with a variety of iris colorations with opaque underprints are also available.

Computer-generated lenses can be made with either a clear or black pupil.

3. Hand-Painted Soft Contact Lenses

Hand-painted prosthetic contact lenses offer the most customized appearance (Figure 3). This lens design allows for complete control of parameters, such as diameter, base curve, iris diameter, pupil size, and iris color. More intricate ocular details can also be added, such as iris flecks and coronas, limbal rings, and blood vessels. Additionally, the artistry can easily be decentered to improve symmetry with the patients' sound eye. An example of this is cosmetic correction of eye alignment in strabismus.

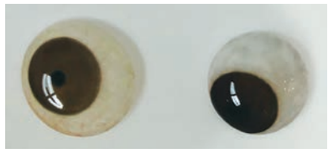

Figure 3. Hand-painted prosthetics offer a natural-looking eye contact lens.

Hand-painted lenses are indicated when a natural-looking eye is required.

Case Presentations

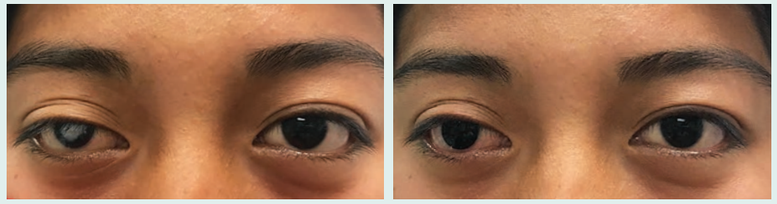

Figure 4a. A patient with dark brown eyes with central corneal scar of the right eye from Peters anomaly.

Figure 4b. The same patient with brown translucent colored lens that effectively masks central corneal scar.

■ **A 15-year-old Hispanic female** with Peters anomaly provides an example of masking corneal irregularities with a translucent tinted lens. This patient was born with micro cornea and a central corneal scar (Figure 4a). A translucent brown tinted lens with a colored iris diameter to match her sound eye effectively masked her corneal scar and visible iris asymmetry (Figure 4b).

Figure 5a. A patient with significant corneal arcus of the right eye.

Figure 5b. The same patient, fitted into a computer-generated brown prosthetic lens to mask his peripheral corneal opacity.

■ **The case of a 57-year-old Hispanic male** with history of blindness from retinal detachment and significant corneal arcus of the right eye demonstrates the good use of a dot-matrix computer-generated brown prosthetic lens (Figure 5a). This lens, without an underprint, was able to mask his peripheral corneal opacity (Figure 5b).

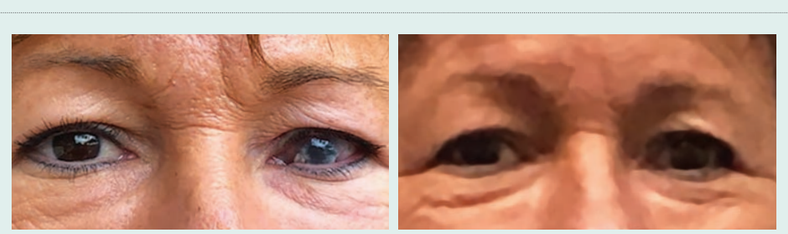

Figure 6a. Corneal and scleral scarring of the left eye due to trauma.

Figure 6b. The same patient fitted with an 18.00mm hand-painted soft lens in the left eye.

■ **The demanding case that required a custom-painted contact lens.** A 57-year-old Caucasian female had trauma-induced corneal scarring and glaucoma in her left eye (Figure 6a). This patient was fitted into a custom hand-painted 18.00mm lens in the left eye in order to mask the corneal and scleral irregularity from her injury (Figure 6b).

To acquire a hand-painted lens, it is necessary to take high-quality photographs of both of the patient's eyes. The photos are needed by the laboratory for custom paint matching. Many laboratories will provide initial color samples that serve as a starting point for the final lens. Consistent photographic angles and lighting between appointments allow for the most accurate color matching.

Painting of an iris usually occurs on a clear contact lens; however, this can also be done over a tinted lens or a lens with an opaque backing. These optional techniques allow colors to appear deeper or darker. Because of their bespoke nature, there is no substitute for hand-painted prosthetic contacts when the best cosmetic outcome is necessary.

SUMMARY

There exists a range of colored contact lenses that serve both prosthetic and therapeutic roles. Patients all have different end-goals and expectations for their visual performance and cosmesis. Having good knowledge of the available products and their uses enables providers to guide their patients through the process to an acceptable and satisfying outcome.

In many cases, the end result is positively life-altering for the patient. As such, fitting these types of lenses—while challenging—is also highly rewarding. ■

REFERENCES

1. Astin CL. The use of occluding tinted lenses. CLAO J. 1998;24(2):125-127.
2. Truong JQ, Ciuffreda KJ, Esther Han MH, et al. Photosensitivity in mild traumatic brain injury: a retrospective analysis. Brain Inj. 2014;28(10):1283-1287.

Dr. Frogozo is the owner of Alamo Eye Care in San Antonio, Texas, where she directs the Contact Lens Institute. She is also a Diplomate of the American Academy of Optometry section of Cornea, Contact Lens, and Refractive Technologies (CCLRT).