TITLE

One and Done: Ortho-K Fitting Success in a Pediatric Patient with High Astigmatism

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BACKGROUND

Orthokeratology (OK) lenses are rigid gas-permeable contact lenses that temporarily reshape the cornea by altering epithelial thickness. In myopic eyes, OK lenses flatten the central cornea and steepen the mid-peripheral cornea, correcting central refractive error and reducing peripheral hyperopic defocus, which is thought to stimulate axial elongation and myopia progression. FDA approval for OK parameters varies by lens design; in this case, approved parameters include up to -5.00 D of myopia and 1.50 D of astigmatism.

CASE DESCRIPTION

An 11-year-old Black female patient presented with her mother for a contact lens evaluation, expressing interest in OK lenses. A comprehensive exam two months prior had led to initiation of atropine 0.01% gtts qd OU for myopia control.

Refraction & BCVA:

OD: -6.50-2.75x180; 20/20-2

OS: -6.25-3.50x005; 20/20-1

Keratometry (Medmont Topographer):

OD: 41.36 / 43.76D @ 100; e 0.75 / 0.48 @ 100 at 8mm

OS: 41.50 / 44.25 @ 091; e 0.70 / 0.38 @ 091 at 8mm

Pupil size:

Photopic: 3.5mm OU

Mesopic: 4.5mm OU

Lens fitting:

Empirical OK lenses were ordered (Table 1) based on corneal topography and corneal eccentricity. At the dispense, both lenses showed an acceptable fit for dispense.

	Brand	BC	Power	DIA	OZD	Flat Ro	Steep Ro
OD	Art Optical MOONLENS®	9.48	+0.50	11.00	5.00	7.97	7.79
OS	Art Optical MOONLENS®	9.45	+0.50	11.00	5.00	8.02	7.82

Table 1: Lens design OD and OS.

Follow up (1 month):

The patient reported excellent vision and comfort after continuous nightly wear.

Uncorrected VA: 20/20 OD/OS

Manifest refraction: Plano OD/OS

ROL: +0.50sph OD/OS

Both lenses were well-centered with appropriate movement, bull's-eye pattern, and edge lift (Figure 1). Corneal health was uncompromised. Topography confirmed centration and treatment power. Continued nightly wear was advised, with follow-up in six months.

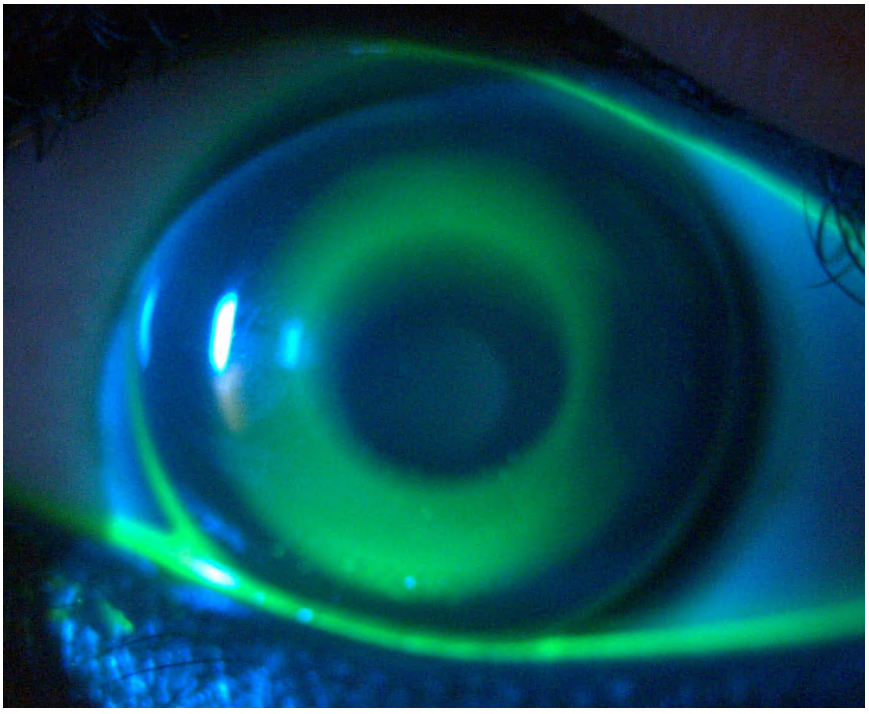

Figure 1: Fluoresceine pattern OS. OD demonstrated a similar pattern.

CONCLUSION

This case demonstrates successful OK fitting with the first empirical lens in a pediatric patient with high myopia and significant astigmatism. Success in this highly toric cornea was likely due to the small OZD of the lens and the use of corneal eccentricity data in designing toric alignment zones, allowing the lens to match elevation differences along the major corneal meridians. With careful education and monitoring, OK remains a viable option for motivated patients even outside standard fitting guidelines. Further study is necessary to assess long-term safety and efficacy of OK in off-label, high-refractive-error cases.