# Orthokeratology for Adult Patients: An Opportunity for Daytime Freedom

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## Introduction

Orthokeratology (OK) has become a mainstay in myopia management for our pediatric patients.[1] Often, these lenses remain overlooked as an option for most adult patients. The reverse curve geometry of OK lenses through overnight wear provide a wholly reversible refractive treatment with total myopic correction for adult and pediatric patients.

## Case Presentation

### MD – Case #1

A 45 year old White male (MD) is seeking contact lenses for daily wear. While wearing any contact lens, he has a significant foreign body sensation in the superior temporal quadrant, under his left upper eyelid. He has been thoroughly evaluated by local optometrists for allergic conjunctivitis, dry eye disease, foreign material or traumatic tissue formation underneath his lid, with no conclusive cause of this sensation.

When attempting to fit him with a variety of daily disposable soft lenses of different materials, such as the Aquacomfort Plus Sphere - nelfilcon A (Alcon) and MyDay Sphere - stenfilcon A (Coopervision), the sensation persisted. The mechanical irritation between his lid and the lens continued to cause discomfort, so by removing the lens during daytime wear, he was able to find comfort in OK lenses.

MD is fit with Euclid's Emerald lens, utilizing an empirical fit strategy, where the final lens parameters are symmetrical in both eyes. MD is wearing the OK lenses for over a year with great success and achieves crisp 20/20 vision in both eyes which lasts throughout the day. This has circumvented his daytime discomfort in his lenses. As he progresses towards presbyopia, we will discuss the possibility of implementing monovision correction.

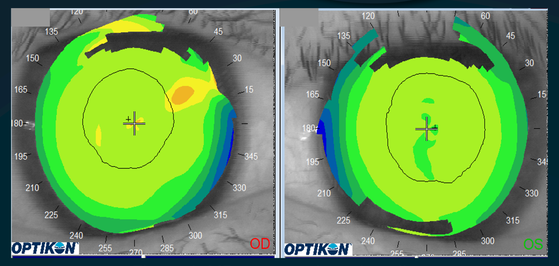


Figure 1: MD topography at baseline

Baseline Refraction:
OD: -2.00-0.75x100
OS: -1.50-1.25x110

K's:
OD:
43.25@37/42.79@127
OS:
43.22@94/42.27@004

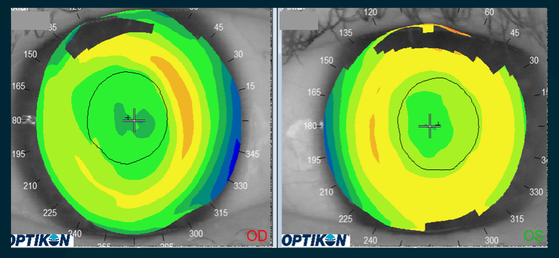


Figure 2: MD topography at his 1 year follow up

Post Treatment Refraction:
OD: pl-0.50x090
OS: +0.25-0.75x095

VA sc:
OD: 20/20
OS: 20/20

| Final Lens Parameters | OD | OS |
|---|---|---|
| Base Curve/Diameter (mm) | 8.8/10.8 | 8.8/10.8 |
| Power | +0.75 | +0.75 |

### CO – Case #2

A 35 year old Black female (CN) presents with moderate to severe dry eye disease, exacerbated by contact lens wear. During her long days of computer work while in her Acuvue 1 Day Oasys (J&J) lenses, she suffers from lens intolerance and cannot wear them past the 4 hour mark.

Before offering alternative options for contact lens correction, CN underwent a thorough dry eye evaluation to create a targeted treatment plan: she completed a SPEED survey with the results adding up to 18, and the slit lamp exam revealed no corneal staining. She tested positive for the presence of MMP-9 bilaterally with Inflammadry, and her meibomian gland (MG) imaging via Lipiscan reveals significant distortion, truncation in the right eye, and greater than 50% dropout in her left eye (Figure 5). The presence of meibomian gland dysfunction along with an inflammatory ocular surface warranted treatment with Xiidra (Lifitegrast 1%) twice a day, and nightly hot compresses to start.

Her motivation to start OK lenses has driven her adherence to her dry eye therapy. After 3 months of strict adherence to dry eye treatment, and significant improvement in her SPEED survey results (at follow up results were a 9), we fit CN into her OK lenses.

CN is fit in Paragon's CRT lens. CN had persistent doubling in her spherical OK lens in her left, which was completely resolved with a toric return zone depth and landing zone angle. CN has been wearing her OK lenses for over 9 months now, with a significant improvement in her dry eye symptoms.

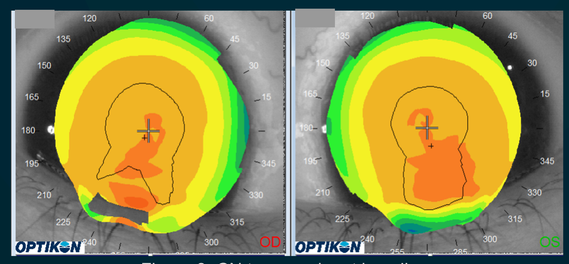


Figure 3: CN topography at baseline.

Baseline Refraction:
OD: -2.75-1.00x075
OS: -3.00-1.00x096

K's
OD:
46.54@62/46.05@152
OS:
46.64@118/46.26@028

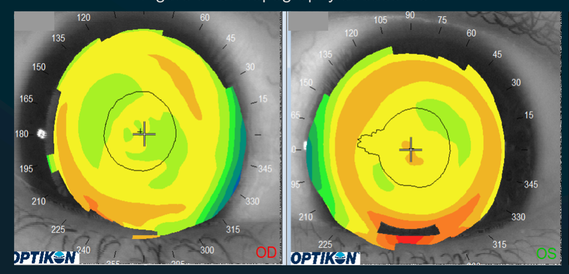


Figure 4: CN - topography at the 6 month follow up appointment

Post Tx Refraction:
OD: +0.25-0.75x090
OS: +0.25-0.75x095

VA sc:
OD: 20/20-
OS: 20/20

| Final Lens Parameters | OD | OS |
|---|---|---|
| Base Curve/Diameter (mm) | 7.8/11.0 | 7.9/11.0 |
| RZD/LZA | 575/34 | 550/575 33/34 |
| Power | +0.50 | +0.50 |

## Discussion

Orthokeratology lenses are a readily used option for pediatric patients substantiated by myopia management studies.[3] This modality for adult patients is underused, but can become a successful alternative to daytime lens wear or even refractive surgery. These cases have outlined successful outcomes in two pre-presbyopic adult patients.

OK lenses have many benefits over refractive surgery, particularly the reversible nature of the treatment. Often the post refractive ocular surface can exacerbate underlying dry eye disease, which can take prolonged time to recover.[4] OK lenses have shown to improve dry eye symptoms in existing soft contact lens wearers and an improvement in goblet cell density after only 1 month of wear.[5]

The night time wearing schedule of OK lenses circumvents daytime discomfort caused by dryness and allergy symptoms. With the option away from contact lenses, patients can experience a break from symptoms they normally associate with contact lens wear.

One of the challenges with fitting adult patients in OK lenses lies in corneal biomechanics. Although the visual outcomes are comparable to soft contact lens endpoints, the corneal hysteresis is known to be greater in adult populations in comparisons to pediatrics.[2] Children often respond to OK treatment more quickly due to the malleability or softness of their corneas. The adult population will respond to OK treatment, but may require a longer fitting period.

Once these pre-presbyopic patient need near vision correction, there are many options available for them. In order to continue with benefitting from an OK lens, a monovision correction would be utilized first.

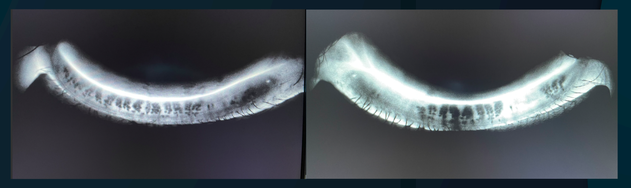

Figure 5: CN - Meibomian gland imaging

## Conclusion

Orthokeratology can gain traction as a successful alternative for adult patients who come in seeking freedom from daytime correction, or refractive surgery as the solution for their myopia. As these patients approach presbyopia, monovision can definitely be an option for near vision correction as well. Outlined in these cases, this lens modality has versatile uses, whether there is no other lens which is be deemed comfortable, or the daytime activity of a patient does not allow for disposable lens wear.

## References

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