

Corneal Gas Permeable Lenses for Microcornea

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Background

- Microcornea is defined as a corneal diameter less than 10 mm in adulthood¹
- Cornea plana refers to a flat cornea with K's flatter than 42D and is associated with high hyperopia and primary open angle glaucoma²
- High hyperopia is associated with an increased risk of amblyopia³

Case Details

- A 16 year old female presents for a contact lens fitting
- History of unknown systemic genetic disorder associated with- short stature, muscular dystrophy, low BMI, benign skin growths
- Known history of illicit drug exposure during gestation
- Previous ocular diagnoses include- microcornea with microphthalmos, cornea plana, strabismus and amblyopia
- Ocular surgical history is positive for strabismus surgery of both eyes three years prior
- Pt has previously been fit unsuccessfully in toric soft and custom soft toric contact lenses- all available options would not keep their shape on globe and caused serious discomfort to the patient
- CC: Pt would like contact lenses to counteract the extreme weight of her habitual glasses and for improved cosmesis
- Entering VA's with habitual specs: OD: 20/30+ NIPH, OS: 20/40+ NIPH

Eye	Manifest Refraction	Pentacam Keratometry
OD	+12.00-4.00x003; 20/30+ NIPH	32.2D@006/39.8D@096
OS	+12.25-4.50x177; 20/40+ NIPH	34.4D@170/39.1D@080

- HVID: 8.5 mm OD,OS
- Axial Length: OD: 20.24 mm, OS: 20.21 mm

Slit Lamp Examination		
	OD	OS
Lids and Lashes	2+ anterior blepharitis	2+ anterior blepharitis
Bulbar Conjunctiva	White and quiet	White and quiet
Tear Film	Adequate lacrimal lake	Adequate lacrimal lake
Cornea	Trace SPK	2mm round stromal haze ST
Anterior Chamber	Shallow and quiet	Shallow and quiet
Iris	Flat, Blue	Flat, Blue
Lens	Phakic- clear	Phakic- clear

- Recent DFE with partner Ophthalmology clinic reports unremarkable posterior segment findings
- Patient is home-schooled and takes classes on a computer
- Patient states that she is excited to wear makeup and work on her artwork unencumbered by glasses

Case Details

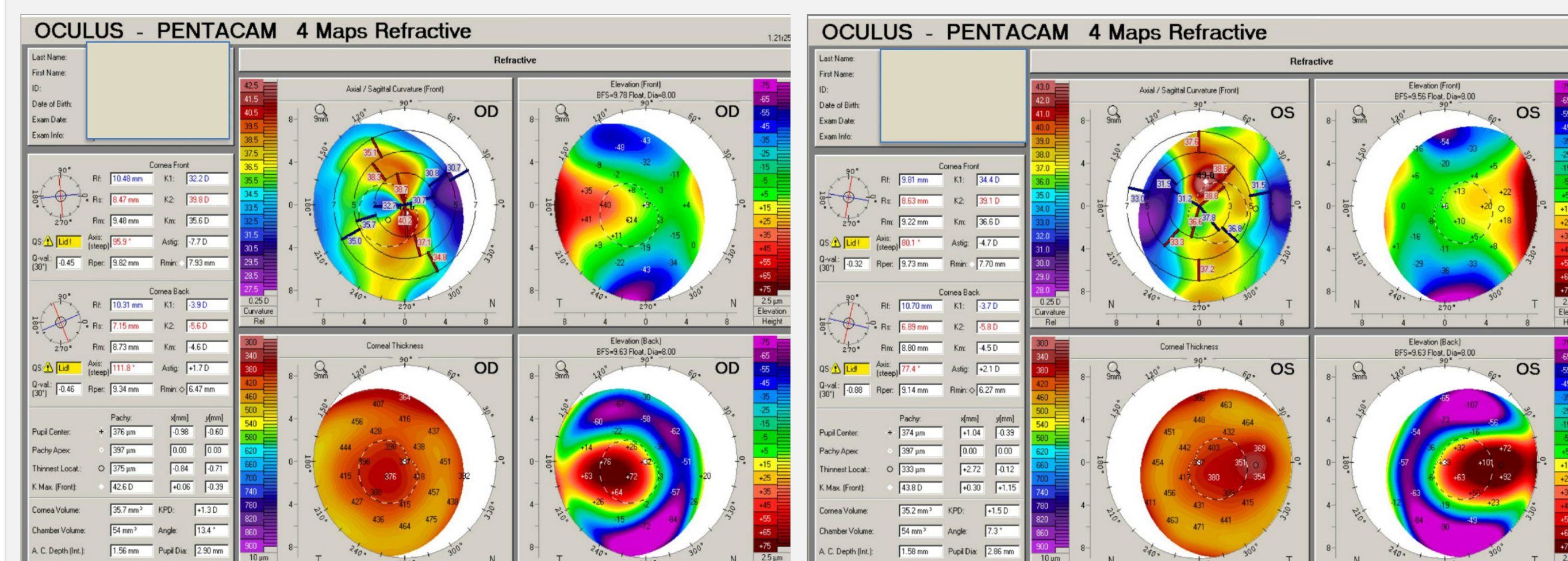


Figure 1: Pentacam topography of right eye

Figure 2: Pentacam topography of left eye



Image 1: Picture of patient wearing habitual specs exhibiting magnification of eyes and adnexa

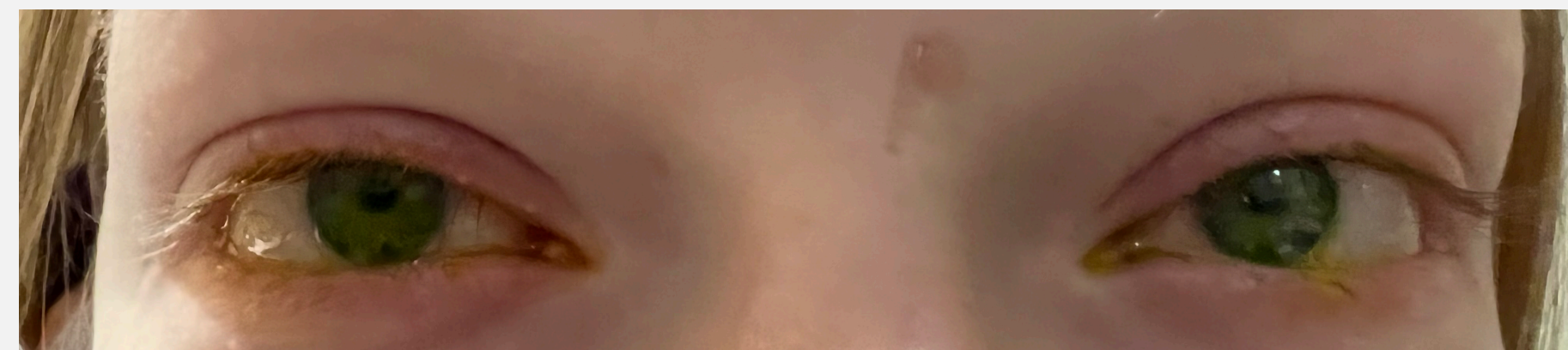


Image 2: Picture of patient with microcornea wearing GP lenses

Discussion

- Soft contact lenses are likely not an option for this patient as custom options have been attempted in the past and caused great discomfort
- Scleral lenses come in larger diameters and can become thick and heavy in high prescriptions
- A corneal gas permeable lens is the best option for this patient due to the ability to better customize diameter and base curve while ensuring oxygen transmissibility to the cornea

Treatment

- Initial TruForm TruFit GP lenses were ordered empirically as follows
OD: 35.27D/8.0mm/+11.00DS
OS: 36.41D/8.0mm/+12.37DS
- At the first dispense two weeks later the lenses fit as follows
OD: 20/40-, ORx: +0.50DS 20/40+, excessive movement and lift
OS: Excessively flat fit, did not remain centered on cornea
- Second dispense
OD: 36.76D/8.0mm/+9.50DS; 20/30, ORx: plano, flat, inf decentered
OS: 38.40D/8.0mm/+10.37DS; 20/50, ORx: +1.00DS 20/30, flat, inf decentered

Treatment

- Third dispense
OD: 39.75D/9.0mm/1 Steep PC/+6.50DS; 20/30-2 ORx: plano, inf decentered, mildly steep w/ small central bubble
OS: 41.36D/9.0mm/1 Steep PC/+7.37DS; 20/40 ORx:plano, inf decentered, moderately steep w/ large central bubble
- Final dispense
OD: 38.75D/8.5mm/+5.50DS/2 Steep PC; 20/40 ORx: plano, mild Inf decentered
OS: 40.36D/8.5mm/+6.37DS/2 Steep PC; 20/30-2 ORx: plano, mild Inf decentered
- Follow-up
 - Patient states that she is happy with the comfort and vision of her lenses
 - Likes to use her lenses when “going out with friends”

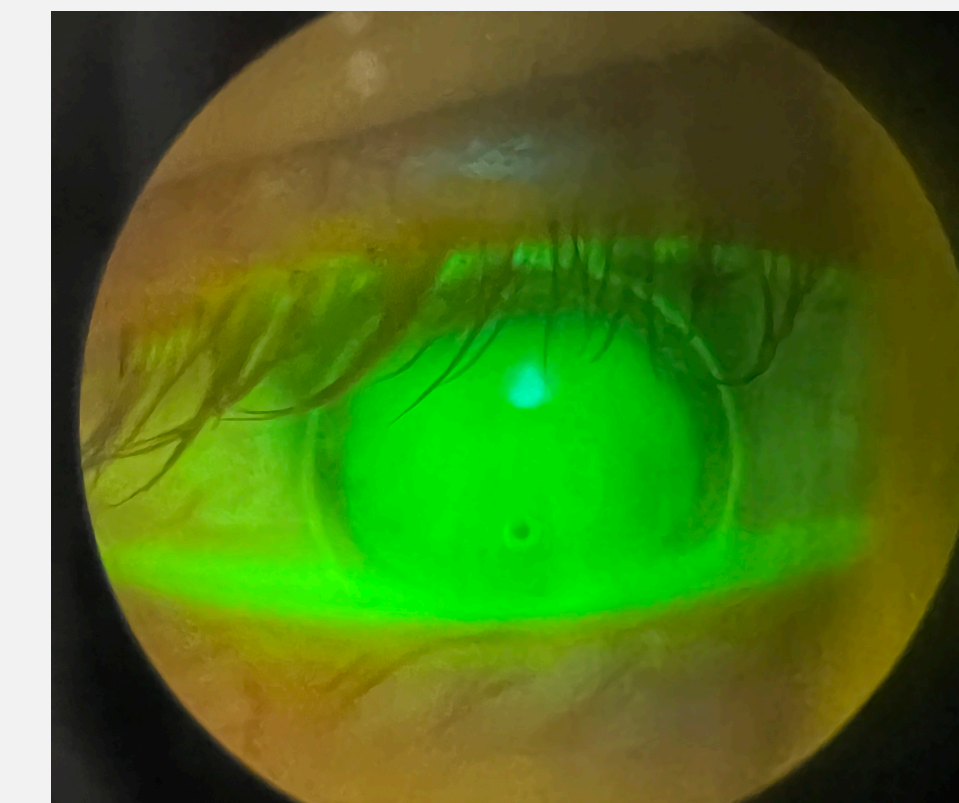


Image 3: Lens on OD with wratten filter, cobalt blue light and NaFI

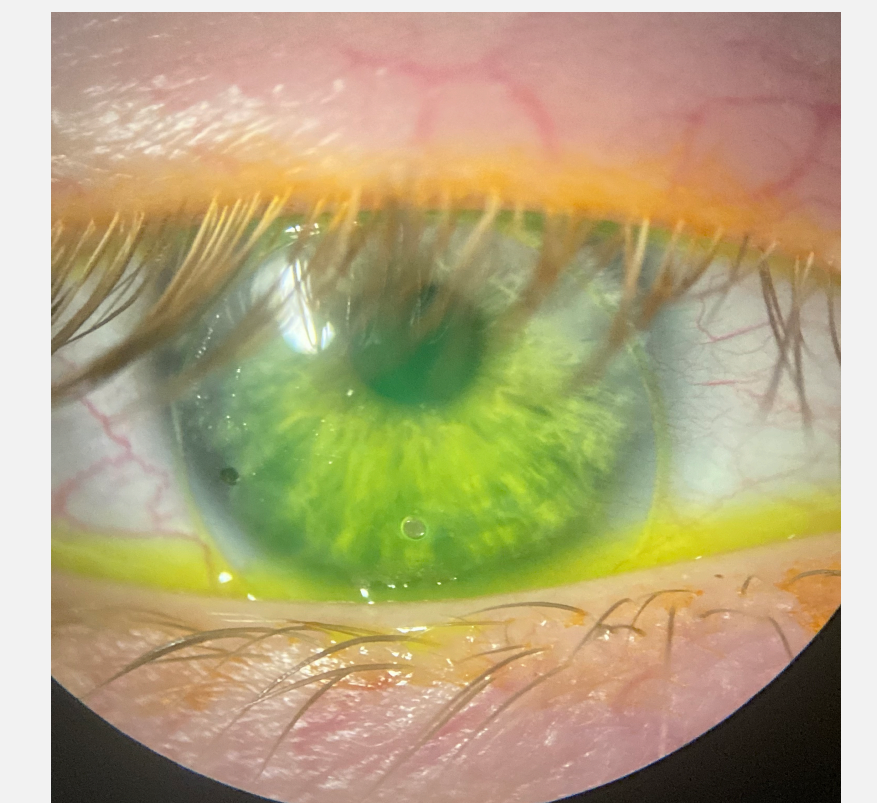


Image 4: Lens on OD with white light and NaFI

Conclusions

- Corneal GP lenses provide customizable overall diameter and base curve which may allow them to be an option in micro cornea and/or cornea plana
- Corneal GP lenses are an option in high hyperopia as they are relatively thin and do not magnify the appearance of the eye
- Contact lenses are dispensable if they provide adequate vision, acceptable comfort, and do not pose a risk to ocular health

References

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- Klimek DL, Cruz OA, Scott WE, Davitt BV. Isoametropic amblyopia due to high hyperopia in children. *J AAPOS*. 2004 Aug;8(4):310-3. doi: 10.1016/j.jaapos.2004.05.007. PMID: 15314589.

Acknowledgements

Thanks to Dr. Katie Looock, OD and the fourth year externs from University of Missouri- Saint Louis for their help in this case.