

# Vaulting the Cornea: Visually Rehabilitating Pellucid Marginal Degeneration (PMD) with Scleral Lenses after Failure with Corneal Gas-Permeable Lenses

Wincy Chung, OD, Dipl. ABO • Sheila Morrison, OD, MSc, FAAO, FSLs, FCCSO • Andrea Lasby, OD, FAAO, FSLs, FCCSO  
Mission Eye Care, Calgary, Canada

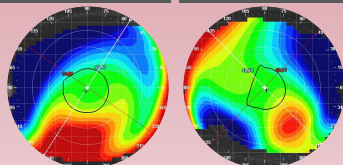
## BACKGROUND

Pellucid Marginal Degeneration (PMD) is a rare, bilateral, non-inflammatory ectatic corneal disorder characterized by inferior peripheral corneal thinning. Unlike keratoconus where the apex typically lies centrally or paracentrally, PMD exhibits maximal thinning inferiorly 1 to 2 mm from the limbus resulting in the characteristic mid-peripheral apex. Standard corneal gas-permeable (GP) lenses are typically designed for a more central corneal apex which may inadvertently bear on the mid-peripheral apex in PMD, leading to discomfort, poor lens stability, and risk of mechanical complications. Corneal GP fits are also highly dependent on the patient's lid anatomy. These challenges can result in failure with corneal GPs. Although there are corneal GP designs for irregular, more oblate corneas on the market, there are limitations to every lens design which can prompt the need for scleral lenses. By creating a fluid reservoir over the irregular corneal surface, well-fitting scleral lenses avoid contact with the cornea, improving patient comfort, lens tolerance, and corneal health.

## CORNEAL TOPOGRAPHY

OD

OS



Corneal topography elevation data



Rose K2 IC 7.4/10.0/  
TPC 0.9/Std steep

Rose K2 IC 7.3/10.0/  
TPC 0.9/Std steep

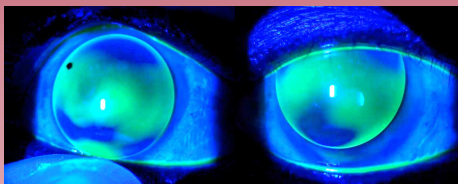
## DISCUSSION

Elevation data from corneal topography provides strong predictive value for the fluorescein pattern seen with corneal GP lenses on eyes without significant lid interaction. However, as demonstrated by the corneal GP fluorescein pattern OD, lens centration is heavily influenced by lid anatomy. Specifically, lid position and degree of laxity are factors which affect lens position. Thus, careful evaluation of lid anatomy is essential when fitting corneal GP lenses.

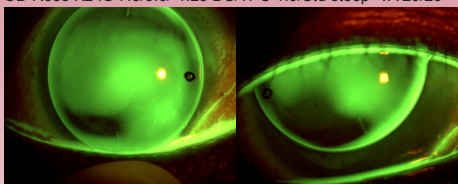
## CORNEAL GP FLUORESCIN OD

WITHOUT LIDS

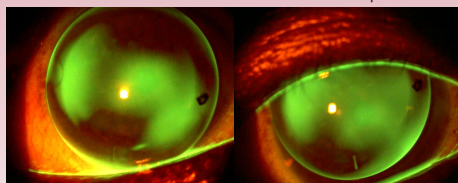
LID ATTACHED



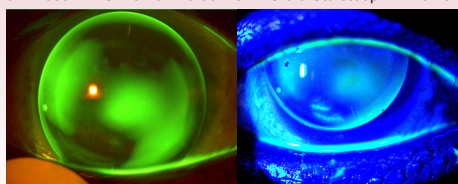
OD Rose K2 IC 7.3/9.6/-1.25 DS/TPC 1.0/Std steep VA 20/25



OD Rose K2 IC 7.5/10.4/-1.50 DS/TPC 1.3/Std steep VA 20/25



OD Rose K2 IC 7.5/10.4/-0.50 DS/TPC 0.9/Std steep VA 20/25

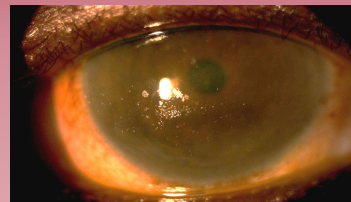


OD Rose K2 IC 7.4/10.0/-1.75 DS/TPC 0.9/Std steep VA 20/25

## SCLERAL LENS FIT

OD

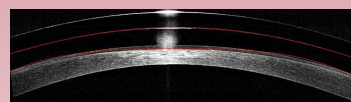
OS



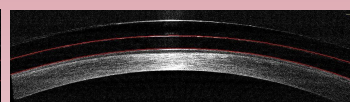
Ampleye toric PC VA 20/25  
BC 8.04 / PWR +2.00 / DIA 16.50 / sag 4400 /  
PCZ -4.00 / LLZ -8.00 / SLZ 1.0 / SLZ toric 6.0



Ampleye toric PC VA 20/25  
BC 8.04 / PWR +3.25 / DIA 16.50 / sag 4200 /  
PCZ 4.00 / LLZ -8.00 / SLZ 1.0 / SLZ toric 6.0



4 hour central vault: 250um



4 hour central vault: 200um

## CONCLUSION

This case illustrates the limitations of corneal GP lenses in patients with PMD, particularly when tight eyelids induce lens decentration and apical bearing. It highlights the importance of evaluating both anatomical and functional factors—such as eyelid tension and patient dexterity—when selecting a contact lens modality. Scleral lenses offer a safe and effective alternative for patients with advanced ectasia who are unable to tolerate other lens types. With proper training and support, even patients with initial handling limitations can achieve successful outcomes with scleral lens wear. Financial constraints often limit access to medically necessary specialty contact lenses, highlighting the need for greater government and insurance coverage.

## REFERENCES

- Mohr N, Shajari M, Krause D, et al. Pellucid marginal degeneration versus keratoconus. *British Journal of Ophthalmology*. 2021;105(12):1638-1644. doi: 10.1136/bjophthalmol-2020-316496.
- Karabatsas GH, Cook SD. Topographic analysis in pellucid marginal corneal degeneration and keratoconus. *Eye (London, England)*. 1996;10(Pt 4):451-455.
- Bower KS, Chhablani DK, Bhatnagar DA, Wambsgäner J. Pellucid marginal degeneration with superior corneal thinning. *Cornea*. 1997;16(6):483-5.
- Sridhar MS, Mahesh S, Bansal AK, Rao GN. Superior pellucid marginal corneal degeneration. *Eye (Lond)*. 2004;18(4):393-9.
- Rao SK, Foglia R, Padmanabhan P, Sridharan G. Corneal topography in atypical pellucid marginal degeneration. *Cornea*. 1999 May;18(3):265-72.
- Krachmer JH. Pellucid marginal corneal degeneration. *Arch Ophthalmol*. 1978;96(7):1217-21.
- Janabhai A, Radhakrishnan H, O'Donnell C. Pellucid corneal marginal degeneration: A review. *Cont Lens Anterior Eye*. 2011;34(2):56-63. doi: 10.1016/j.clae.2010.11.007

## ACKNOWLEDGEMENTS

ART CARES program by ART Optical, Mission Eye Care staff