

Management of antimetropia and pellucid marginal degeneration with semi-scleral lenses: A Case Report

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Abstract

A 66 years old patient diagnosed with a Pellucid Marginal Degeneration (PMD) in both eyes is referred to be fitted in contact lenses. What makes this case challenging is the fact that the patient was also showing a severe anisometropia leading to a limited level of visual acuity with his habitual mode of correction. Semi-scleral lenses with reverse geometry have been used to improve his vision.

Background

- PMD is an ectasia where high asymmetric astigmatism is developed. It is usually first seen between 20 and 40 years old. In contrast with keratoconus which is central or paracentral, PMD has an area of thin cornea 1 mm above the limbus.
- Semi-scleral lenses have larger diameter, which lies on the conjunctiva without any pressure on the cornea. The fluid layer between the cornea and the lenses compensates for the high amount of astigmatism and smooths the surface.
- The method to evaluate these lenses is based on fluorescein observation under the lens, under an optic section at the slit lamp with white illumination. The fluorescein thickness (between the cornea and the lens) should not exceed 100 microns, which is equivalent to 1/5 of regular cornea's thickness.
- Corneal warpage is a temporary corneal distortion.

Case presentation

- The patient had a retinal detachment on the left eye in 2004 that was treated with a scleral buckle surgery and a Pneumatic Retinopexy. He underwent a cataract removal procedure on the same eye, but without a posterior chamber intra-ocular lens (PCIOL) implant.
- He has glaucoma o.u., being medicated with topical medication: Timoptic (Timolol Maleate 0.5%, Merck Frosst) BID.
- In October 2008, he underwent a cataract extraction procedure for the right eye with implantation of a PCIOL. Surgery's outcome was complicated with the occurrence of an endophthalmitis, which was treated and had resolved without sequelae.
- He's also taking drops of PredForte (Prednisolone acetate 1%, Allergan) unknown posology, and Apo-Ketorolac 0.5% (ketorolac tromethamine, Apotex) with unknown posology.
- Topography maps were obtained from the Medmont Topographer (see figure 1). Maps showed a classic PMD pattern on the right eye (2 kissing birds) while the left eye showed a distorted PMD profile.
- BCVA OD -3.00/-6.00x090 with a fluctuating VA from 20/70 to 20/50 OS +10.75/-0.50x055 20/60

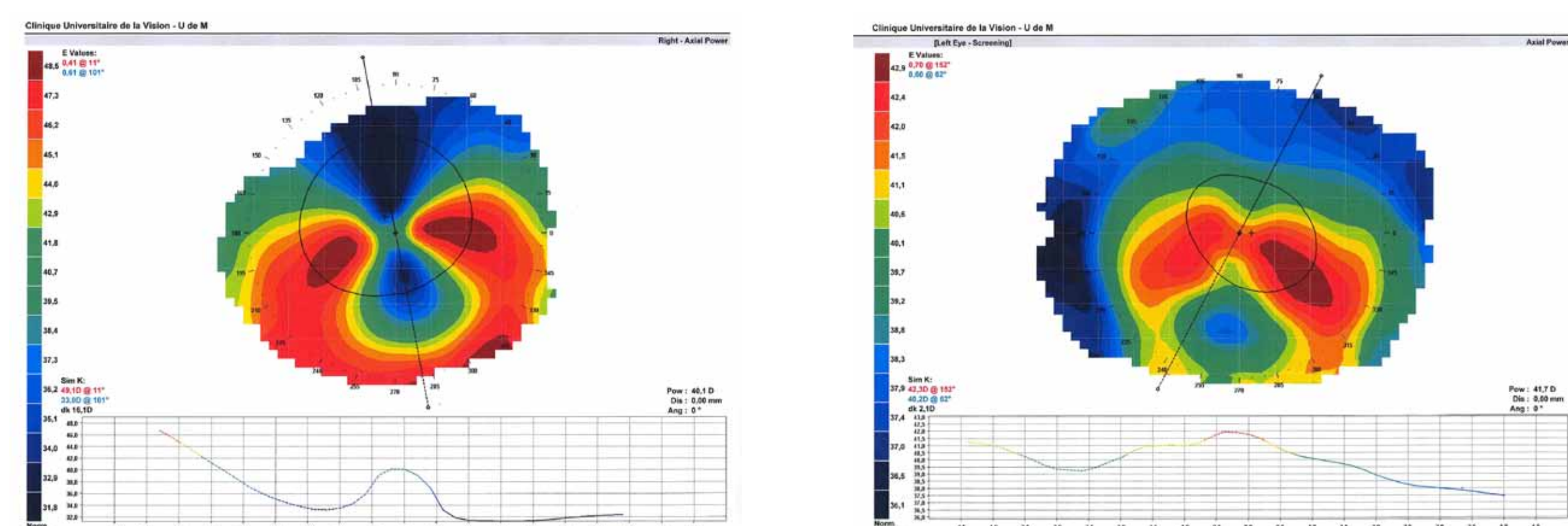


Figure 1: Medmont topography, showing PMD pattern OU, more advanced OD
Courtesy of the University of Montréal

Trials

Trial lenses

OD	OS
Maxim 4	Maxim 4
BC 8.44 mm	BC 8.23 mm
PWR plano	PWR plano
SAG 4,42	SAG 4.00
Diameter 16.0 mm	Diameter 16.0 mm
Optic Zone Diameter: 8.50 mm	Optic zone Diameter: 8.00 mm

Evaluation

- The lenses were evaluated as well centered, with almost no movement (like expected).
- No bleaching of the conjunctival vessels was noted.
- A 1.5 mm bubble was present in the inferior quadrant OD, which meant that the sagittal height was too high, so a flatter the mid-peripheral curve was ordered.
- Over refraction gave -3.00D for 20/30 VA on right side and +8.00D on the left eye, for 20/25.
- Delivery of the lenses was done with his local optometrist.

Follow-up

- Entering VA of the right eye was evaluated to 20/25 and 20/60 for the left eye.
- With the fluorescein section at the slit lamp, bearing was noted inferiorly o.u., in the ectatic portion.
- Topographic maps revealed a corneal warpage secondary to this bearing (figure 2).
- Once the lenses were removed, a staining area was present on both sides, more on his left eye, which confirmed the insult to the corneal tissue.

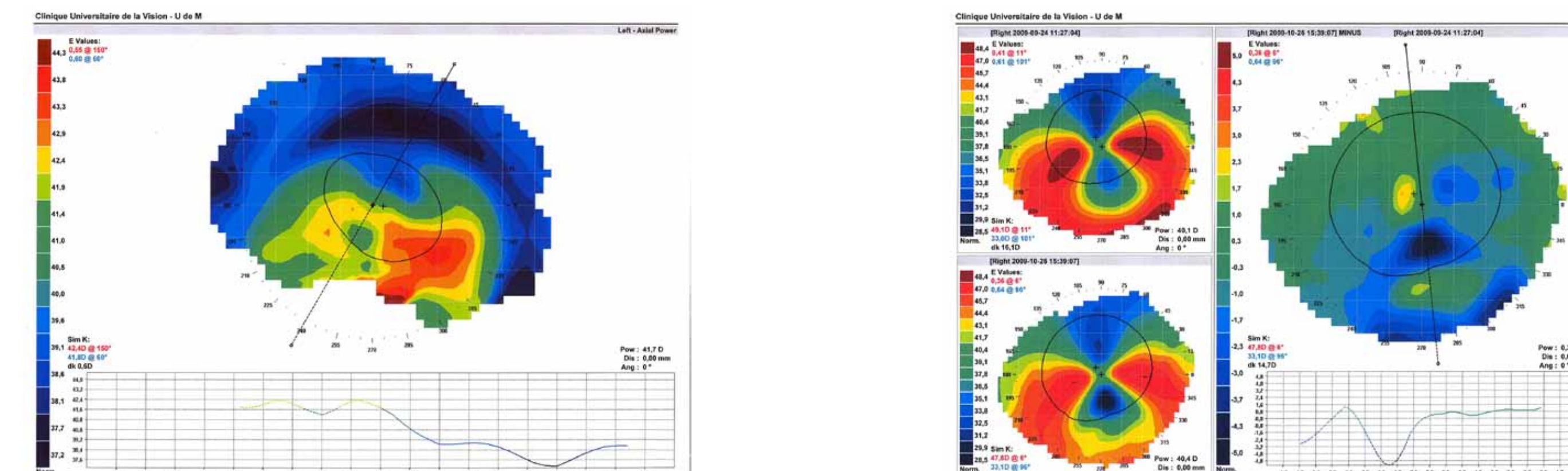


Figure 2: Medmont topography, showing flattening of the inferior quadrant in both eyes
Courtesy of the University of Montréal

- A reverse geometry has been attempted in order to increase the sagittal height over the inferior cornea without being too steep. That way, the sagittal height was increase with a larger vault over the inferior cornea, without bubbles in the center (cause by the flatter base curve).

Final lenses

OD	OS
OD Maxim 4 R (reverse geometry)	OS Maxim 4 R (reverse geometry)
BC 8.44 mm	BC 8.44 mm
PWR -3.00 D	PWR +10,50 D
SAG 4,62	SAG 4.32
Diameter 16.4 mm	Diameter 15,8 mm
Optic Zone Diameter: 8.50 mm	Optic zone Diameter: 8.50 mm

Results

- The lenses were well centered and were showing limited movement.
- BCVA with CLs were 20/25 OD and 20/30 OS.
- Slit lamp evaluation confirmed that the lenses did not bear on the cornea anymore.
- The over refraction was +0.25 OD and plano OS.
- The fluorescein pattern showed an adequate fluorescein pattern. The peripheries were aligned o.u. with an edge lift evaluated as a little flat but acceptable.
- After removal of the lenses both corneas were clear, without staining, and conjunctiva did not show any redness or compression.

Conclusion

- In this challenging case, a severe PMD with high anisometropia was compensated with the use of Maxim 4 semi-scleral contact lenses (Acculens, Denver, Colorado).
- The customized design of these lenses allows to vault the cornea and to correct high amount of irregular astigmatism, improving the vision and the quality of life of the patient.
- The reverse geometry of the lenses helps to raise the sagittal height to reduce inferior bearing, without allowing bubbles under the lens.
- This method will be surely used with other PMD cases.
- The patient was very pleased with his new lenses, which brought his BCVA from 20/50 OD and 20/40 OS to 20/25 OD and 20/30 OS.

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