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 extraction procedure on the same eye, but without a posterior chamber intra-ocular lens (PCIOL) implant.
• He has glaucoma u. v., 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 sagittal height to reduce inferior bearing, without allowing bubbles under the lens.
• 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.

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 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 conjunctivas 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.

Acknowledgments
• M. Denis Latendresse for his technical support
• Acculens (Denver, Colorado), for their expertise, in particular Mr Bill Masler

Final lenses

<table>
<thead>
<tr>
<th>Trial lenses</th>
<th>OD</th>
<th>OS</th>
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<tbody>
<tr>
<td>PWR plano</td>
<td>BC 8.44 mm</td>
<td>BC 8.44 mm</td>
</tr>
<tr>
<td>SAG 4.62</td>
<td>PWR plano</td>
<td>PWR plano</td>
</tr>
<tr>
<td>Diameter 16.4 mm</td>
<td>SAG 4.00</td>
<td>SAG 4.00</td>
</tr>
<tr>
<td>Optic Zone Diameter: 8.50 mm</td>
<td>Diameter 16.0 mm</td>
<td>Diameter 16.0 mm</td>
</tr>
</tbody>
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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 -0.25 OD and plano OS.
• 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 ectasic 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 1: Medmont topography, showing PMD pattern OU, more advanced OD
Courtesy of the University of Montréal

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