*Clinical & Refractive Optometry* is pleased to present this continuing education (CE) article by Dr. Langis Michaud entitled **A Case of Bilateral Aphakia.** In order to obtain a 1-hour Council of Optometric Practitioner Education (COPE) approved CE credit, please refer to page 319 for complete instructions.

# A Case of Bilateral Aphakia

*Langis Michaud, OD, MSc, FAAO (Dipl.)*

**ABSTRACT**

**L.S. is a medical resident presenting with bilateral aphakia secondary to cataract surgery performed when she was a teenager (Type 1 diabetes). She has been wearing contact lenses ever since, but her vision remains below her expectations. This Case Report highlights the elements that are important to consider pointing terms of refitting a patient such as this one in order to preserve her ocular health in a contaminated environment (a hospital); the best possible visual acuity; and normal binocular function. Custom silicone hydrogel contact lenses were prescribed with success and her vision was fully restored through the wearing of glasses over her contact lenses. The glasses corrected her residual astigmatism and presbyopia. The Author concludes that it is possible to consider a dual prescription of contact lenses and glasses in order to address specific visual problems. This combination represents the best alternative to correct the patient's vision and maintain good ocular health over time in this type of case.**

## INTRODUCTION

Since the introduction of IOLs in the 1980s, it is relatively rare to have to deal with uncorrected bilateral aphakia. Can anyone recall what an Omega or Welsh 4-Drop lens looks like? It is even rarer to have to fit and/or to prescribe a correction for a young patient presenting with such an ametropia. Amblyopia, ocular health and binocular vision status are important factors that come into play in this type of case, and each of these aspects can limit a practitioner's options in terms of providing the best solution for the patient's needs. Sometimes it takes more than just contact lenses, and this type of challenge presents yet another way to practice creative optometry.

L. Michaud — Associate Professor, School of Optometry, University of Montreal, Montreal, QC

*Correspondence to: Dr. Langis Michaud, School of Optometry, University of Montreal, 3744 Jean-Brillant, Suite 190-70, Montreal, QC H3T 1P1; E-mail: langis.michaud@umontreal.ca*

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## SUBJECTIVE

L.S. is a medical resident at the Medical School of the Université de Montréal. She was referred to Clinique Universitaire de la Vision in June 2008 for a contact lens fitting as her ophthalmologist had ceased to practice a few weeks prior.

Her case history revealed that she suffered from type 1 diabetes. She had developed secondary bilateral cataracts very early in life and was surged in Lebanon in 1989. Obviously, at that time - and considering her young age - IOLs were not considered. At first, the patient was corrected with glasses, and, later, with contact lenses when she immigrated to Canada a few years later.

She relied on insulin injection on a daily basis but denied taking any other medication on a regular basis. Her ocular health had been assessed by an ophthalmologist at her last visit 3 months ago, and no diabetic retinopathy was identified.

At the time of her visit, she was wearing conventional soft lenses (KF5 UM, Laboratoires Blanchard, Sherbrooke). The parameters of the lenses were: +13.00 OD and +10.50 OS with a base curve of 8.6 mm and a diameter of 14.5 mm OU. She also wore a pair of +2.50 readers on top of her lenses. She reported a good comfort level with the lenses on, but her vision did not meet her expectations, especially after several hours at work in the hospital.

## OBJECTIVE

Since the time of the patient's visit to an ophthalmologist 3 months earlier, a complete oculo-visual examination had not been conducted and the emphasis was now on the contact lens fit. Entering visual acuities at far were 6/9- (20/30) OD and 6/12- (20/40) OS; 6/7.5-1 20/25 OU. Over-refraction findings were OD -0.50 -0.75 x 150 6/7.5+ (20/25) and OS +1.00 -1.00 x 40 6/7.5-1 (20/25). With the lenses on, 3 degrees of fusion were present. There was no strabismus or manifest ocular deviation.

The patient's lenses were slightly decentred in an upper position and moved more than 2 mm upon blinking. A lag of 1-1.5 mm was seen in lateral and transversal gaze. Both lenses exposed the limbal area when the patient looked up. The surfaces were clean without any significant deposits. The patient stated that she rubbed and rinsed her lenses on a daily basis with ReNu® MultiPlus (Bausch & Lomb) solution before overnight soaking.

The corneal diameter was measured at 12.5 mm and, surprisingly, it did not present any vascularization. Topographic maps revealed a symmetrical cornea, regular in shape for both eyes, without any sign of corneal warpage. Sim K values were: 41.75 x 43.00 @ 70 OD and 41.50 x 42.50 @ 116 OS.

After removal of the lenses, the anterior segment was evaluated with slit lamp. There was no sign of corneal edema, even though the patient was wearing low Dk conventional lenses for many hours each day. A grade 1 punctuate staining was identified on the lower corneas of each side. There were no follicules and a trace of papillae (grade 1-) was seen on the upper conjunctiva. The left pupil presented with an anterior synechia leading to a distortion. Vitreous gel was seen in both anterior chambers (iridodonesis).

Refractive findings were: OD +12.50 -1.00 x 145 6/7.5 (20/25) and +10.00 -1.00 x 45 6/7.5 (20/25) +2; 6/6 (20/20) OU at far, with an addition of +2.00 at near (0.50 M OD, OS and OU). The vertex distance was measured at 13 mm OU.

## Assessment

This patient presented with bilateral aphakia, but without amblyopia. Her refractive status included high hyperopia, astigmatism and presbyopia. Her ocular health was good, considering the lenses worn for the past few years and her condition. However, the contact lens fit was not appropriate. Based on the movement and position of her lenses, they appeared to be too flat.

## Plan

In order to refit this patient properly, we had to take into account several aspects of her situation. First of all, she was a medical resident and would, in the future, be working in an environment rife with infections. She was obliged to wear her visual correction for many hours daily, especially when working in the emergency room (24-hour shifts). Her ocular health had to be preserved considering these two factors.

The only material available to meet minimal safety criteria is silicone hydrogel with a care regimen based on hydrogen peroxide. Considering the central thickness of the lenses to be worn, it is easy to understand that no other contact lens material offers the DK/t (oxygen permeability related to the lens thickness) minimally required to alleviate hypoxia and related chronic problems such as punctuate keratitis, corneal warpage or neovascularization.

Considering the refractive components to correct, we had to deal first with a high hyperopia, meaning a thicker lens. Silicone hydrogels are now available in custom form (Ciba Vision, Laboratoires Blanchard, Contamac) to meet this demand. Bearing in mind the level of hyperopia, it could seem unnecessary to consider the astigmatic component of the refraction, but for many patients this could make the difference between good, sharp, clean vision or blurred vision, provided by the spherical equivalent correction, as in the case of this patient. The only way to discard the correction of a small astigmatism in contact lenses is to let the patient experience the difference through a trial. If the toric lenses do not improve the outcome, a spherical equivalent correction should be prescribed. However, for most patients, there is a difference and, therefore, it is essential to prescribe a toric contact lens. It also makes sense to correct an astigmatism when it is clear that to over-minus the patient will lead to an increased demand on accommodation. For a younger patient, this might not be a major issue, but for a patient over 35 years old, this means increasing the convergence, as well. Most patients work at computer distance, and this higher demand both in accommodation and convergence can bring them into a discomfort zone and may emphasize any binocular dysfunction already present. On the other hand, compensating the astigmatism with an appropriate toric contact lens fit can reduce the discomfort at near, help the patient see better and have greater comfort with the lenses on, and alleviate any asthenopia symptoms during near or computer work.

Basically, the patient has to be corrected for near distance, with an addition. Although there is a very good silicone hydrogel product on the market (PureVision® Multifocal [Bausch & Lomb]), it is not available in high-plus correction with astigmatism. Therefore, the fitting strategy needs to be refined in order to select the best solution. Considering that the patient already relied on a pair of readers to achieve her near tasks, the decision was quickly made to compensate the near demand with glasses. This decision also helped us regarding the compensation of the astigmatism, since it is not available in custom silicone hydrogel form. This combined solution of contact lenses and glasses was proposed to the patient and she accepted it without any concern, as she was used to it.

The selection of the trial lenses was made based on the refractive findings, vertex compensated, and the keratometric readings (BC 4D flatter than average K). The diameter of the lens was selected based on the corneal diameter (12.5) + 2 mm. Ciba's 02 custom lenses are available in several base curves and diameters. The closest parameters to match the theoretical ones were

ordered for the right eye: Power +15.50, base curve 8.9, diameter 14.8. For the left eye, the power and the diameter matched the design parameters, but we selected a flatter base curve in order to have two options for the trial fitting, and in consideration of the fact that high-plus lenses have to be fitted flatter. The sag value of a plus lens is higher for the same base curve, compared with a minus one. Therefore, prescribing a flatter base curve for the plus lens is a must in order to obtain an optimal fit on the cornea of a given profile. The parameters of the left lens were ordered as follows: OS +12.50, base curve 9.20, diameter 14.8.

At delivery, the lenses were well positioned and centered for each eye. The movement of the left lens was slightly greater than that of the right, but was considered acceptable since the lenses draped over the entire corneal area well, and the limbus was not exposed in any gaze. Subjective comfort with both lenses was considered good to excellent by the patient, even though the modulus of the lens was higher. Visual acuity was 6/12- (20/40) OD, 6/9- (20/30) OS, and 6/9 (20/30) OU. Over-refraction improved this outcome with -1.00 -0.75 x 150 for OD (6/6 [20/20]); +0.50 -1.25 x 25 (6/6 [20/20]) for OS with an addition of +2.00 OU (0.50M).

The patient was educated about the following care regimen: Opti-Free Replenish™, rubbing and rinsing the lenses before soaking them in Clear Care™ hydrogen peroxide overnight. The former solution was given because it is considered important to rub the silicone hydrogel lenses, which is not possible with the Clear Care solution. Moreover, the use of Replenish might have potentially helped the patient store her lenses for a short period of time, considering that the minimal soaking time in Clear Care is 6 hours. This was more practical considering her work duties and schedule. The use of hydrogen peroxide was considered safer in terms of the hospital environment.

The final prescription was established considering the over-refraction and, as previously discussed, a pair of progressive glasses was provided to correct the astigmatism and the presbyopia. The wearing of glasses over the contact lenses was recommended for near tasks, and to increase distance vision during specific activities such as movies, television and driving.

Contact lenses: 02 Custom (Ciba Vision, Duluth, Georgia)
OD +14.50 BC 8.9 /14.8
OS +13.00 BC 8.9/14.8

Glasses:
OD Plano -0.75 x 150 Add +2.00
OS Plano -1.25 x 25 Add +2.00

## Conclusion

A dual prescription of contact lenses and glasses in order to address specific visual problems is an option in certain cases. This combination represents the best alternative in terms of correcting a patient's vision and maintaining good ocular health over time. Other cases that could possibly benefit from the use of this combination of contact lenses and glasses are high anisometropia, monocular aphakia, and very high ametropia. The use of contact lenses with high permeability or in daily disposable form can be safe and efficient, as well as helping the practitioner provide the patient aesthetic and functional glasses.