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Minus Piggyback Lens Overlaying ReSTOR® Multifocal Lens in High Myopia

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Key Words
Multifocal lens · Piggyback lens · High myopia ·

Abstract
Background: We report the case of a 40-year-old female patient treated with implantation of the Acrysof® IQ ReSTOR® lens (Alcon, Fort Worth, Tex., USA) with overlaying Acrysof EXpand® minus piggyback lens (Alcon). Methods: The patient had high myopia and was diagnosed with presbyopia and bilateral posterior subcapsular cataract. She desired to be spectacle-free and opted to undergo bilateral placement of the ReSTOR multifocal lens. The necessary intraocular lens (IOL) power was +3.5 in the right eye and +4.0 in the left eye, though the range of commercially available ReSTOR lenses is +6.0 to +34.0 D. In order to achieve emmetropia in this case of high myopia, it was determined that an EXpand minus piggyback lens would be necessary. Results: Implantation of the ReSTOR lens with overlaying EXpand minus piggyback lens was performed successfully and without complication. At 5 months postoperatively, the patient had 20/20 uncorrected visual acuity in both eyes. She reported a high level of satisfaction and was able to return to her daily activities including reading and driving without spectacles. Conclusion: We report successful primary implantation of AcrySof EXpand minus piggyback lenses overlying the AcrySof IQ ReSTOR lens in a patient with high myopia. Long-term follow-up and further evaluation is necessary to establish piggyback IOL implantation with multifocal IOL as an accepted treatment for high myopia with presbyopia.

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Introduction

Multifocal intraocular lenses (IOLs) have been repeatedly used successfully for the treatment of loss of accommodation, providing for the restoration of both near and far vision. The AcrySof® IQ ReSTOR® (Alcon, Fort Worth, Tex., USA), an example of a multifocal IOL, provides good distance and near vision, reduces dependence on corrective glasses, and results in a high level of patient satisfaction [1].

Pseudophakic patients may be ametropic after implantation of IOLs. LASIK and PRK have been used to enhance visual acuity in pseudophakic patients treated with IOL implantation [2]. However, in patients who are not LASIK candidates, piggyback minus-power IOLs have been used to correct the refractive error in patients with myopic pseudophakia [3]. This same piggyback technique has been employed primarily in patients with high myopia that cannot be corrected with traditional IOLs [4].

Here, we present the case of a relatively young, presbyopic patient with very high myopia who was treated with AcrySof EXpand® minus piggyback lenses overlying AcrySof IQ ReSTOR lenses because she was not a LASIK candidate.

Material and Methods

Our patient was a 40-year-old female who presented to the John A. Moran Eye Center at the University of Utah, Salt Lake City, Utah, USA, for evaluation of presbyopia and high myopia. Additionally, the patient complained of problems with glare and night vision, and was subsequently diagnosed with mild bilateral posterior subcapsular cataract. At presentation, the patient's corrected distance visual acuity was 20/20 in the right eye and 20/30 in the left eye with a manifest refraction of –14.50 + 1.50 × 102 in the right eye and –15.50 + 2.25 × 82 in the left eye. Visual acuity decreased to 20/70 in the right eye and 20/100 in the left eye with brightness acuity testing. The patient desired to be spectacle-free and opted to undergo bilateral placement of the AcrySof IQ ReSTOR multifocal lens.

Corneal measurements were performed using a Pentacam (Oculus, Lynnwood, Wash., USA), and axial length was measured using the IOLMaster (Carl Zeiss Meditec AG, Dublin, Calif., USA). The necessary IOL power was +3.5 in the right eye and +4.0 in the left eye, as calculated by the SRK/T formula. However, the range of commercially available ReSTOR lenses is +6.0 to + 34.0 D. In order to achieve emmetropia in this case of high myopia, it was determined that a minus piggyback IOL would be necessary. The difference between the predicted IOL and the lowest ReSTOR power was calculated to select the appropriate AcrySof EXpand piggyback lens. To achieve the targeted postoperative refractive error of 0.0 D, the decision was made to implant a +6.5 D ReSTOR lens with a –3.0 D EXpand piggyback lens in the right eye and a +7.0 D ReSTOR lens with a –3.0 D EXpand piggyback lens in the left eye. Standard phacoemulsification and lens implantation were performed. The initial power of the piggyback lens overcorrected the patient's myopia, and a sulcus lens exchange procedure was performed 2 months postoperatively, replacing the piggyback lens in the right eye with a –1.0 D lens and the piggyback lens in the left eye with a –2.0 D lens.

Results

The patient was seen 1 day postoperatively, and had uncorrected visual acuity of 20/30 in the right eye and 20/20 in the left eye. At 1 month postoperatively, the patient had

uncorrected visual acuity of 20/20 in the right eye and 20/25 in the left eye, with binocular near uncorrected visual acuity of 20/20. At 5 months postoperatively, the patient had 20/20 uncorrected visual acuity in both eyes. At that time, the postoperative refraction in the right eye was –0.50 + 0.75 × 70 + 20/20 and in the left eye it was +0.25 + 0.50 × 95 + 20/20–2. Intraocular pressure was 21 mm Hg in the right eye and 20 mm Hg in the left eye. There were no reports of significant side effects or adverse events including no evidence of iris transillumination defects or iris chafe. The patient reported a high level of satisfaction and was able to return to her daily activities including reading and driving without spectacles.

Discussion

We have presented the case of a relatively young, presbyopic patient with very high myopia who was treated with EXpand minus piggyback lenses overlying ReSTOR lenses because she was not a LASIK candidate. The outcomes of this procedure were positive on all accounts: improved distance and near visual acuity in addition to a high level of patient satisfaction. Prediction error during the first piggyback lens implantation was likely due to high axial length secondary to myopia.

The piggyback lens technique involves the placement of a second IOL in the ciliary sulcus to fine-tune refraction. This technique has been used successfully to treat patients with residual myopia after primary IOL surgery [3], to resolve myopic refractive error in pseudophakic eyes that occurred after penetrating keratoplasty [5], and to treat high myopia secondary to keratoconus [4].

Akaishi et al. [6, 7] have presented two case series where piggyback lenses have been successfully placed in conjunction with multifocal IOLs because of hyperopia. However, we believe ours is the first report in the literature of primary implantation of minus piggyback lenses overlying multifocal lenses due to high myopia. Long-term follow-up and further evaluation is necessary to establish piggyback IOL implantation with multifocal IOL as an accepted treatment for high myopia with presbyopia.

Disclosure Statement

None of the authors has a financial or proprietary interest in a product, method, or material presented here.

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