

Bifocal Scleral Lenses for Myopia Control in High Myopia and Astigmatism

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BACKGROUND

Myopia is one of the most common disorders of the eye. In fact, that 30% of the world is currently myopic and this will increase to 50% by the year 2050. High myopia increases the risk of irreversible vision loss and is correlated with comorbidities such as glaucoma, macular degeneration, retinal detachments, and premature cataracts. Children who are myopic are the most at risk since there is more time for progression to higher myopia. Thus, early intervention is crucial for preventing high myopia and its associated visual impairments.

Myopia control with contact lenses is accomplished by creating myopic defocus while reducing the amount of peripheral defocus assumed to act as a retinal cue to slow myopic eye growth. This case report discusses the use of bifocal scleral gas permeable (GP) lenses for myopia control in a 14-year-old with high myopia and astigmatism.

HISTORY

Chief Complaint & History of Present Illness

A 14-year-old Hispanic male presented as a referral for a myopia control contact lens evaluation. This teenage basketball player had never worn contact lenses before. He wanted to play basketball but was shy and unsure because of his thick spectacle prescription (Figure 1).

Ocular and Medical History

Ocular history was significant for degenerative myopia that progressed -4.00 diopters in the previous 2 years. Additionally, he had high astigmatism in both eyes and is currently wearing glasses that are a few years old. His medical history was unremarkable.

CONTACT LENS EVALUATION FINDINGS

Manifest Refraction and Visual Acuity

OD: -18.00-4.25x170 20/60

OS: -16.25-3.00x 155 20/40

Globe Axial Length

OD: 29.81 mm

OS: 26.90 mm

Anterior Biomicroscopy

Both eyes unremarkable

Corneal topography

OD: 43.37 @013/46.04@103

OS: 43.01@108/ 45.80@078

Lens designs for myopia control

Orthokeratology and custom bifocal soft lenses were not ideal for this patient due to his high myopia and astigmatism. Instead, the patient was fitted into center distance bifocal scleral contact lenses in both eyes (Figure 2).

Final Lens Parameters

Naturalens (Advanced Vision Technologies, Lakewood, CO)

OD: 45.00/-16.70 ADD +3.00 /16.10 VA 20/25-

OS: 45.00/-16.37 ADD +3.00 /16.10 VA 20/25-

Follow-up

At the 3 and 6 weeks progress evaluation, the patient reported good vision and has no issues with the lenses while participating in his athletic activities. He was scheduled for a follow-up in 6 months to monitor for myopia progression.

Figure 1. (Left) Thick spectacles typical of high myopia and astigmatism.

Figure 2. (Right) Center distance scleral contact lenses for myopia control, and improved vision and cosmesis.



DISCUSSION

Typical orthokeratology treatments do not aim to correct for high myopia and astigmatism. Similar to orthodox orthokeratology, bifocal contact lens optics slow the progression of myopia. A study revealed that during a 2-year treatment period, bifocal contact lens wear resulted in a reduction of 50% in the progression of myopia and 29% reduction in axial elongation compared to single vision contact lenses.

For patients with high myopia and astigmatism scleral GP lenses offer greater comfort, more stable optics, and superior protection than corneal GP lenses. Adding front surface bifocal optics to scleral GP lenses decreases high myopia and astigmatism in children.

CONCLUSION

Myopia is increasing worldwide; however, with early intervention, high myopia can be prevented. Myopia control through contact lenses aims to create myopic defocus in order slow eye growth. Scleral GP bifocal contact lenses are a good choice for contact lens myopia control in children with high astigmatism and myopia.

SELECTED REFERENCES

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