Soft Center-Distance Daily Disposable Multifocal Lenses Aid Esophoric Pediatric Patient with Low-Dose Atropine Induced Diplopia

Felicia Timmermann OD, MS, FAAO and Stacy Zubkousky, OD, FSLS, FAAO

Nova Southeastern University College of Optometry • Fort Lauderdale, Florida

ABSTRACT

A pediatric case study regarding poor tolerance and diplopia with low-dose atropine for myopia management and resolution of near exam findings and symptoms with soft center-distance multifocal contact lens wear.

CASE HISTORY

A 10-year-old male patient presented for a comprehensive eye exam with a history of bilateral myopia and was interested in myopia management options. The patient had a self-reported history of myopia since 5-years-old and an unknown progression rate due to lack of prior exam records. Management options were discussed, including soft-multifocal contact lenses, orthokeratology, and low-dose atropine.[1] Patient and mother preferred an ophthalmic drop modality and low-dose atropine 0.025% QHS OU was prescribed in addition to distance vision only glasses. Due to the stability in refractive error, the patient could continue in habitual pair if preferred. Near esophoria findings were also discussed along with the corresponding potential sides effects, such as diplopia and asthenopia. Patient and mother deferred a near add and preferred to remove glasses for near work.

Exam Visit	Modality	Visual Acuity (cc)	Prescription	Near Cover Test	Near Fusional Vergences (cc)
Visit 1 Initial	Glasses	OD: 20/20 OS: 20/20	OD: -1.00D OS: -1.00D	sc: 2 ep' cc: 8 ep'	18/28/12

Three days after starting low-dose atropine 0.025% QHS OU treatment, the mother contacted the office reporting the patient noted constant near horizontal diplopia and blurred vision that did not resolve with or without glasses wear at near. The patient immediately discontinued low-dose atropine management and noted timely resolution of symptoms.

DIFFERENTIAL DIAGNOSES

1. High esophoria at near with limited compensating negative fusional vergence ranges
2. Intermittent esotropia at near
3. Blur at near perceived as diplopia

DIAGNOSIS:

Due to the delay in returning to clinic, symptoms resolved prior to evaluation. Upon review of prior exam records, it was suspected that the patient had an increase in esophoric posture at near that was potentially induced by low-dose atropine and limited compensating negative fusional vergence ranges.

Literature reports that low-dose atropine has the potential to increase esophoria at near.[2,3] Prior to initiating low-dose atropine 0.025% QHS OU, the patient had an 8Δ esophoric posture at near with the following near compensating negative fusion vergence ranges: 18/28/12 (blur/break/recovery). Based on Sheard's criterion, the compensating fusional reserve to blur value should be double the amount of the heterophoric posture to prevent or minimize the incidence of diplopia, strain, or asthenopia at near.[4,5] Though the near phoric posture was not measured when the patient was utilizing the low-dose atropine 0.025% drops, it is suspected that the esophoria potentially worsened at near and the patient did not have the adequate fusional vergence ability to compensate and prevent diplopia.

TREATMENT

Myopia management options were discussed with the patient and mother including:

- Soft multifocal contact lenses
- Orthokeratology
- Continue low-dose atropine 0.025% QHS OU and prescribe bifocal at near
- Lower low-dose atropine to 0.01% QHS OU, prescribe bifocal at near, and build tolerance to higher concentration of low-dose atropine (ie. 0.025% or 0.05%)

Contact lenses were encouraged due to the poor tolerance to low-dose atropine and the benefit of the peripheral add to aid in the esophoric posture at near in addition to myopia management. The patient and mother preferred to discontinue low-dose atropine and complete a soft multifocal contact lens fit at that visit. The patient was fit in a soft center-distance daily disposal lens in both eyes and demonstrated comfort in vision and wear. Included are the visual findings based on modalities. Accommodative findings, including accommodative amplitudes and monocular estimate method (MEM), were normal at all evaluations.

Exam Visit	Modality	Visual Acuity (cc)	Over-Refraction	Near Cover Test	Near Fusional Vergences (cc)
Visit 1 Initial	Glasses	OD: 20/20 OS: 20/20	-------	sc: 2 ep' cc: 8 ep'	18/28/12
Visit 2 CL Fit	Glasses	OD: 20/20 OS: 20/20	Stable Refraction	sc: 2 ep' cc: 6 ep'	x/16/14
Visit 3 1-week F/U	Soft D-centered MF CLs	OD: 20/20 OS: 20/20	OD: plano OS: plano	sc: ortho cc: ortho	x/16/14
Visit 4 3-month F/U	Soft D-centered MF CLs	OD: 20/20 OS: 20/20	OD: plano OS: plano	sc: ortho cc: ortho	x/16/12

CONCLUSION

This case demonstrates the dual benefit of multifocal contact lenses in managing myopic progression in the presence of binocular vision disorders. It highlights the importance of myopia management modality selection and the potential side effects that could occur depending on binocular vision status. Soft multifocal contact lenses serve an added benefit for patients with esophoric postures at near and may alleviate symptoms with close work when near optical adds are indicated.[2,6]

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