Prescribing Unequal ADDs As A Treatment For Uniiocular, Pseudophakic Children With Amblyopia

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Test | Initial Presentation | 11 Months Post Surgical Examination
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Added visual acuity (Distance) | OD 20/40 Snellen<br>OS 20/50+2 Snellen | OD 20/40 Snellen<br>OS 20/50+2 Snellen
Added visual acuity (Near) | OD 20/25<br>OS 20/100 | OD 20/25<br>OS 20/100
Cover Test | No strabismus was detected | No strabismus was detected
Stereocuity | No global random dot stereopsis | No global random dot stereopsis
Refraction | OD -1.25 -3.00 x 175<br>OS -1.00 -3.00 x 003 | OD -1.25 -3.00 x 175<br>OS -1.00 -3.00 x 003
Best corrected visual acuity (Distance) | OD 20/30+1<br>OS 20/50 | OD 20/30+1<br>OS 20/40 with +2.50 ADD
Best corrected visual acuity (Near) | OD 20/25<br>OS 20/40 | OD 20/25<br>OS 20/40
MEM through subjective | OD +1.50<br>OS +0.75 over +2.50 ADD | OD +1.50<br>OS +0.75 over +2.50 ADD
Stereocuity through subjective and ADDs | No global random dot stereopsis | 400 seconds of arc local stereopsis
Accommodative Amplitude | OD 100<br>OS Not measured | OD 100<br>OS Not measured
Slight lamp examination | OD normal<br>OS normal | OD normal<br>OS normal
Intraocular pressures (non-contact tonometry) | OD 15 mmHg<br>OS 13 mmHg | OD 15 mmHg<br>OS 13 mmHg
Dilated fundus examination | Normal OD and OS | Normal OD and OS

**CASE DETAILS**

A 4 year old African American girl, presented to The Eye Institute for a comprehensive eye examination with a chief complaint of difficulty seeing the eye chart at her office. The patient returned 4 months later:

1. **Myopia and Astigmatism**
   - Rx: OD -1.50 -2.50 x 175<br>OS -5.00 sphere (Balance Lens)
   - Contact lens corrections.  However, the IATS reported that there are surgical complications with IOIs that do not require daily care, which reduces parent stress as compared to caring for contact lens corrections. However, the IATS reported that there are surgical complications with IOIs such as infection, decentering of the IOIs, and additional surgeries to remove capsular opacities. The results from the IATS have not stated whether IOI or contact lens treatment is associated with better visual acuities following the removal of a unilateral congenital cataract during the first six months of life.

In 2013, Nilahnani and VandelVenn did a retrospective study on children 5.3 to 18 years old who had monocular intraocular lens implantation. The results revealed that with monofocal IOI, acuities of 20/40 or better were achieved at distance and near without the need for a spectacle correction. This activity to have good uncorrected distance and near vision in a pseudophakic patient is known as "pseudophakic accommodation or pseudophakic pseudoaccommodation." Pseudophakic accommodation is defined as a dynamic change in the refractive state of the eye caused by an interaction between the contracting ciliary muscle and the zonular capsular bag, resulting in a change in refraction at near viewing. Myopic astigmatism, axial IOI movement, pupil size, axial length of the eye, corneal focality and aberration may be contributing factors to pseudocommodation. Pseudophakic pseudoaccommodation is the static optical property/depth of field and depth of focus) of the pseudophakic eye and IOI that provide satisfactory distance and near vision.

Our patient with monocular pseudophakia required a +2.50 ADD in order to attain her best corrected near visual acuity of 20/40. Further examination of CN’s accommodative response to an accommodative stimulus on Monocular Estimated Method revealed a larger than normal lag of +1.50D in her phakic eye, and +0.75D OS over her +2.50 ADD. Based on the results of MEM, unequal ADDs were prescribed. It is unclear if CN’s mild amount of pseudoaccommodation (either due to dynamic or static changes in her refraction), contributed to our findings of an accommodative imbalance, or if the accommodative lag was due in part to the amblyopia syndrome. Nevertheless, unequal ADDs were prescribed with the goal of trying to achieve good visual acuities, balanced accommodation, and binocularity.

**CONCLUSION**

This case demonstrates the importance of checking the accommodation not only in the pseudophakic eye, but also the aphakic eye. In the case of CN, providing her with unequal ADDs provided her with clear, comfortable near vision, and local stereopsis. Future research is needed to further investigate the effect of pseudocommodation on the accommodation of the phakic eye. Further investigation is also needed to determine if the unconventional treatment of pseudophakes by prescribing unequal ADDs is the best treatment for improving acuity and binocular function in cases of uniiocular, pseudophakic patients with deprivational amblyopia.

**REFERENCES**


**Assessment and Plan:**

1. **Refractive Amblyopia OD**, improving, BCVA 20/20 Snellen, 20/30 ETDRS
2. Deprivational amblyopia OS secondary to history of cataract OS stable, BCVA 20/40
   - Continue patching right eye 2 hours per day with 1 hour of near activities
   - Follow up in 6 weeks
3. **Pseudophakia OS**
   - Mild posterior capsule opacities not obscuring vision, monitor

The patient was lost to follow-up.

**DISCUSSION**

The literature provides little information about intraocular lens implants for uniiocular cataracts in childhood. J.P. Burke et al. (1989), reported that in the 1980s, the standard treatment for the child with a congenital cataract was early cataract extraction followed by a contact lens for the aphakic eye and occlusion therapy during the critical period of development. In the 90’s, it was reported that intraocular lens implantation was the standard treatment for children. More recently, the Infant Aphakia Treatment Study (IATS) stated that intraocular lens implantation in infants will soon become standard of care, as posterior chamber intraocular lenses replicate the optics of the crystalline lens and provide partial or total refractive corrections with improved visual acuities. The IOIs do not require daily care, which reduces parent stress as compared to caring for contact lens corrections. However, the IATS reported that there are surgical complications with IOIs such as infection, decentering of the IOIs, and additional surgeries to remove capsular opacities. The results from the IATS have not stated whether IOI or contact lens treatment is associated with better visual acuities following the removal of a unilateral congenital cataract during the first six months of life.

**BACKGROUND**

There is little information in the literature about prescribing for and treating children with uniiocular pseudophakia and deprivational amblyopia with poor binocular vision. In most cases, a +3.00 ADD for near vision is prescribed for the pseudophakic eye, creating an accommodative imbalance between the two eyes, unequal visual acuity, and poor stimulus for binocularity at near.

**TEST**

**CASE DETAILS**

A 4 year old African American girl, presented to The Eye Institute for a comprehensive eye examination with a chief complaint of difficulty saving the eye chart at her pediatrician’s office with her left eye. She did not report any headaches, diplopia, flashes, floaters, itching, burning or tearing. According to the child’s mother, the prenatal, birth, and postnatal history were normal. Developmental milestones and current health status were also normal. The child had no history of trauma and she was not taking any medications.

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**Photograph showing a dense cataract in the left eye (not a picture of patient)**

The child was examined by a pediatric ophthalmologist for a five weeks post initial exam, who recommended that she have a cataract extraction with posterior chamber IOL implantation. He also recommended patching the right eye after the surgery to improve the visual acuity in the left eye.

Cataract surgery was performed about a month after the pediatric ophthalmology consultation.

**Eleven months after her cataract extraction and intraocular lens implant, the patient reports to The Eye Institute with a chief complaint of failing her vision screening at school. The vision in her left eye was blurry at distance with her correction on.**

**Habitan Rx**

**OD -1.50 -2.50 x 175<br>OS -1.00 -300 x 180**