

Pediatric Refractive Surgery

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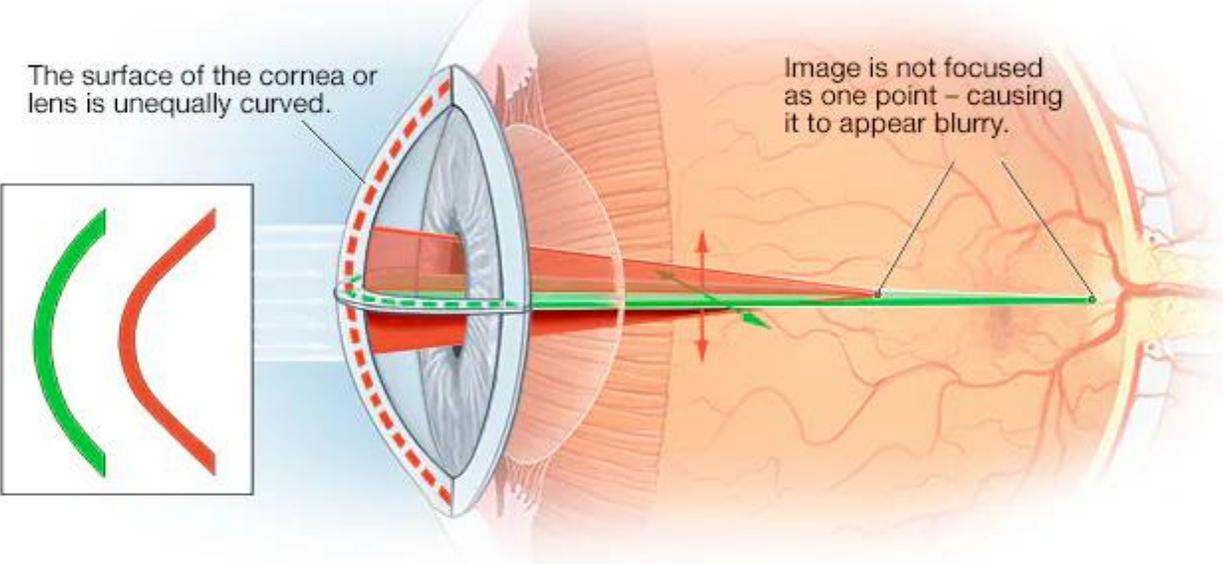
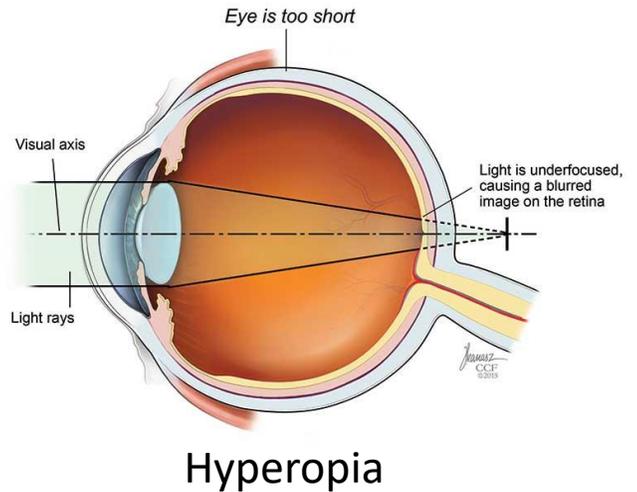
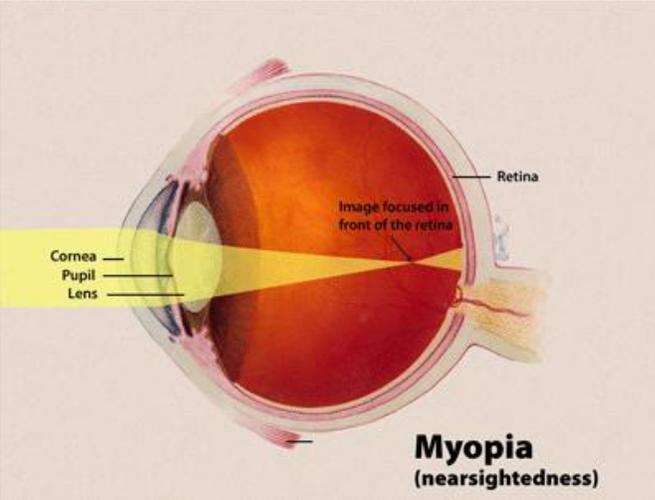
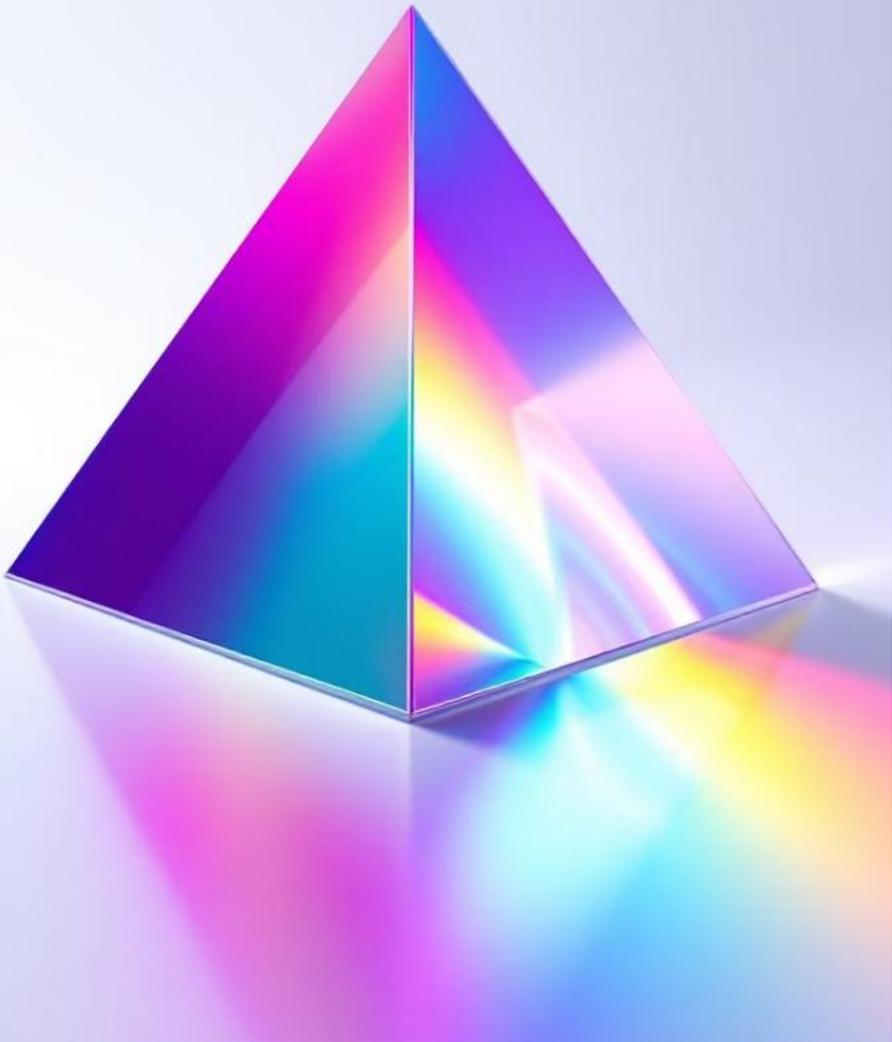
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*I have no financial interests
to disclose.*

Refraction



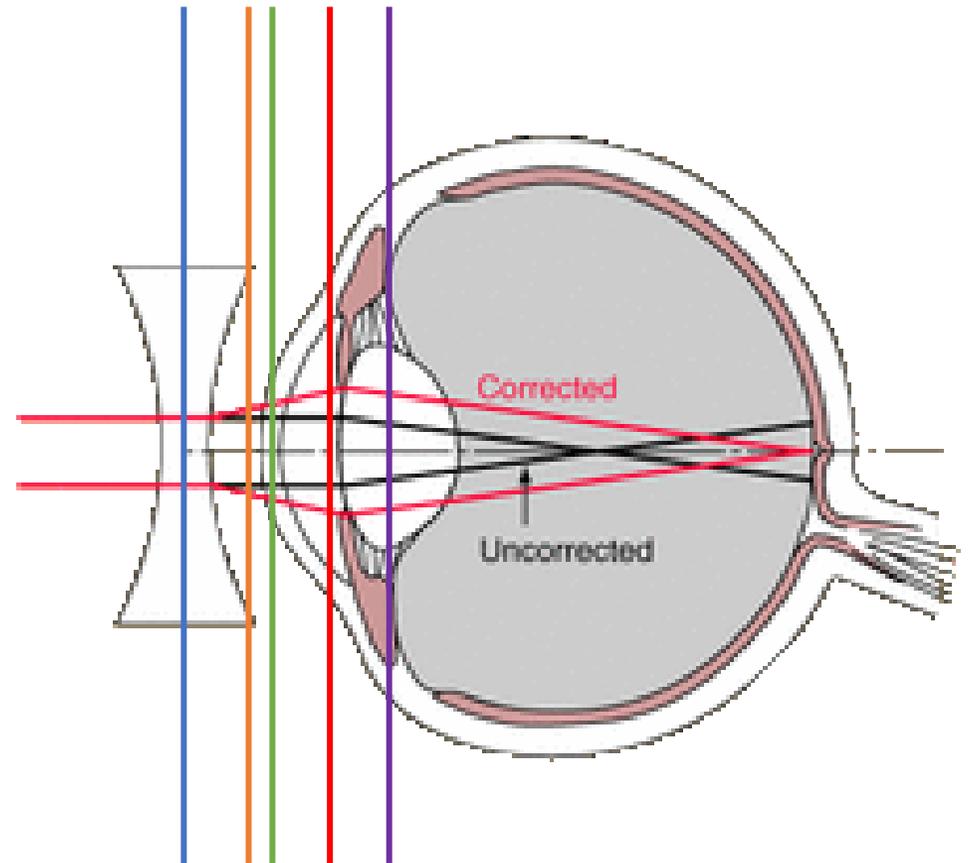
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Astigmatism



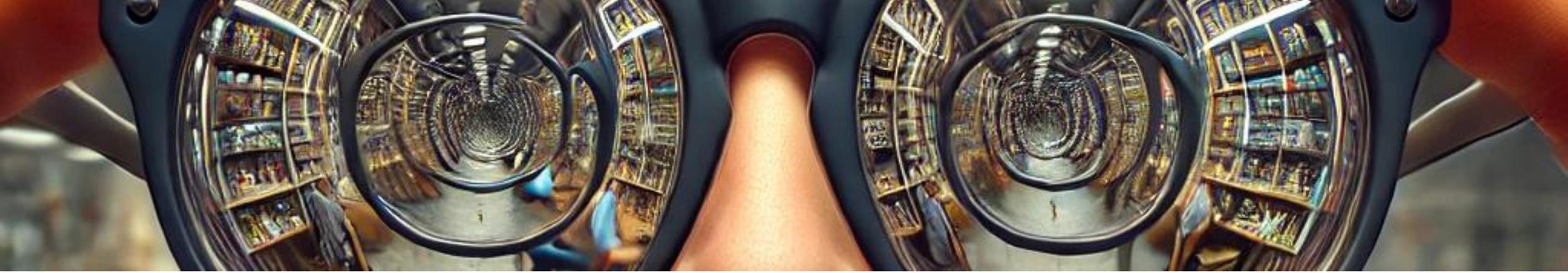
Refractive correction

- Spectacles
- Contact lenses
- Keratorefractive surgery
- Phakic intraocular lens
- Refractive lens exchange





Which of the following is an indication for pediatric refractive surgery? SELECT ALL THAT APPLY



Pediatric refractive surgery indications

- Significant refractive error

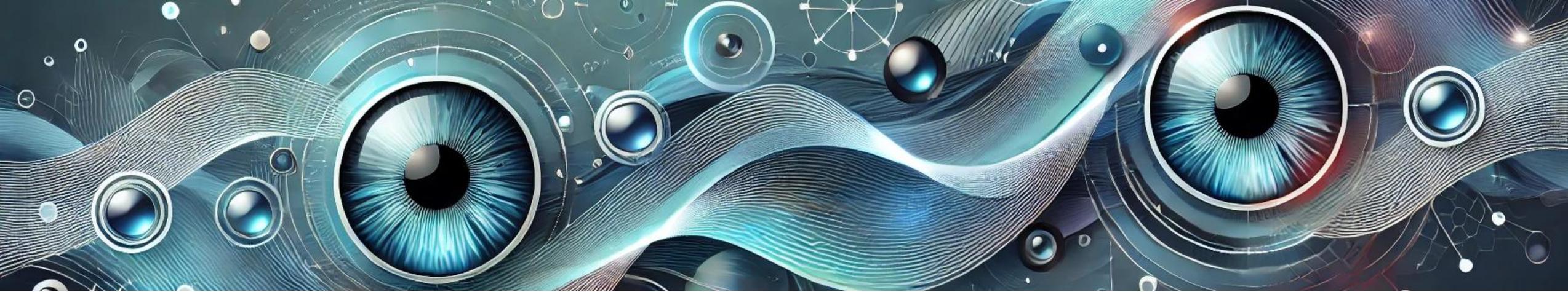
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- Difficulty wearing spectacles or contact lenses

- Amblyopia
- Strabismus
- High-powered lens distortions
- Prismatic effects
- Narrowed field of view
- Anisometropia
- Aniseikonia
- Asthenopia
- Neurobehavioral disorders
 - Autism
 - Down syndrome
 - Cerebral palsy
 - Angelman syndrome
 - Developmental delay
- Poor head control
- Craniofacial or ear abnormalities



Which of the following refractive errors is most likely to cause amblyopia in a 3 year-old patient with no other ocular pathology?

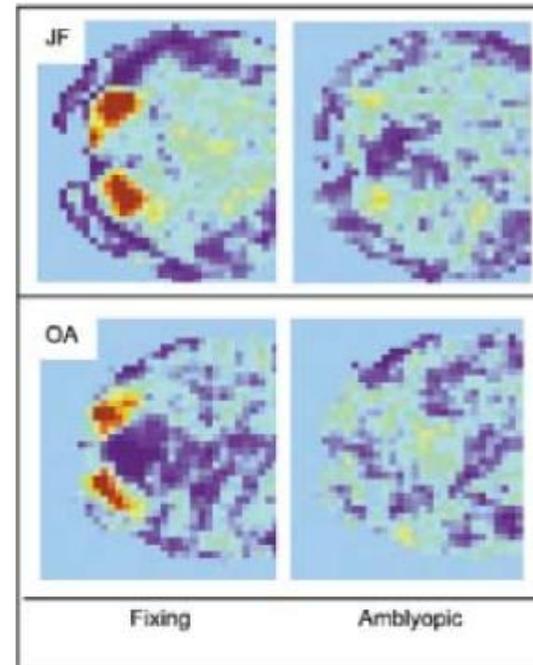
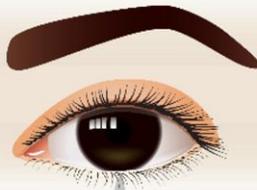


Amblyopia

Non-Amblyopic eye



Amblyopic eye



Refractive Correction in Children



TABLE 3 GUIDELINES FOR REFRACTIVE CORRECTION IN INFANTS AND YOUNG CHILDREN

Condition	Refractive Errors (diopters)			
	Age <1 year	Age 1 to <2 years	Age 2 to <3 years	Age 3 to <4 years
Isoametropia (similar refractive error in both eyes)				
Myopia	5.00 or more	4.00 or more	3.00 or more	2.50 or more
Hyperopia (no manifest deviation)	6.00 or more	5.00 or more	4.50 or more	3.50 or more
Hyperopia with esotropia	2.00 or more	2.00 or more	1.50 or more	1.50 or more
Astigmatism	3.00 or more	2.50 or more	2.00 or more	1.50 or more
Anisometropia (without strabismus)*				
Myopia	4.00 or more	3.00 or more	3.00 or more	2.50 or more
Hyperopia	2.50 or more	2.00 or more	1.50 or more	1.50 or more
Astigmatism	2.50 or more	2.00 or more	2.00 or more	1.50 or more

Additional benefits

- Improvements in:
 - Communication
 - Socialization
 - Motor skills
 - Cognitive and language skills

Paysse, E. A., Gonzalez-Diaz, M., Wang, D., Hager, M. R. T. J. & Coats, D. K. Developmental improvement in children with neurobehavioral disorders following photorefractive keratectomy for high refractive errors. *J Am Assoc Pediatric Ophthalmol Strabismus* **15**, e6 (2011).





Contraindications

Keratorefractive surgery

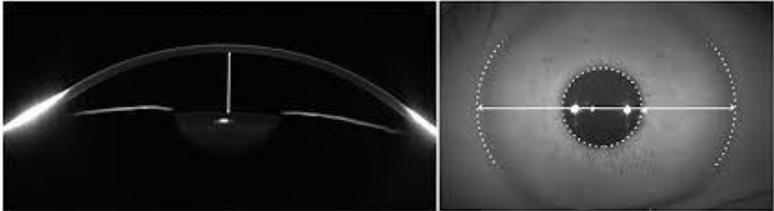
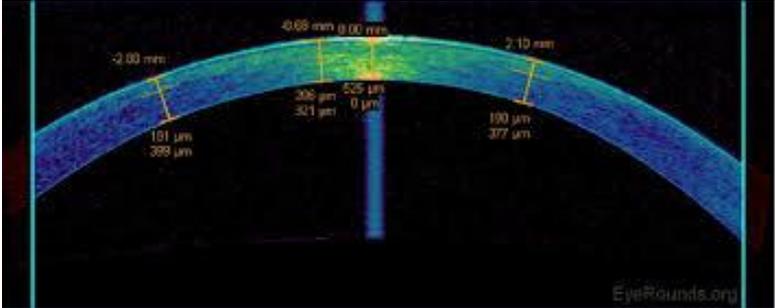
- Severe dry eye
- Exposure keratopathy
- Ocular surface cicatrization
- Keratoectasia
- Corneal dystrophies



Pre-operative evaluation

- Full ocular history and examination
- Motility assessment
- Cycloplegic refraction
- Ocular biometry

Pre-operative biometry

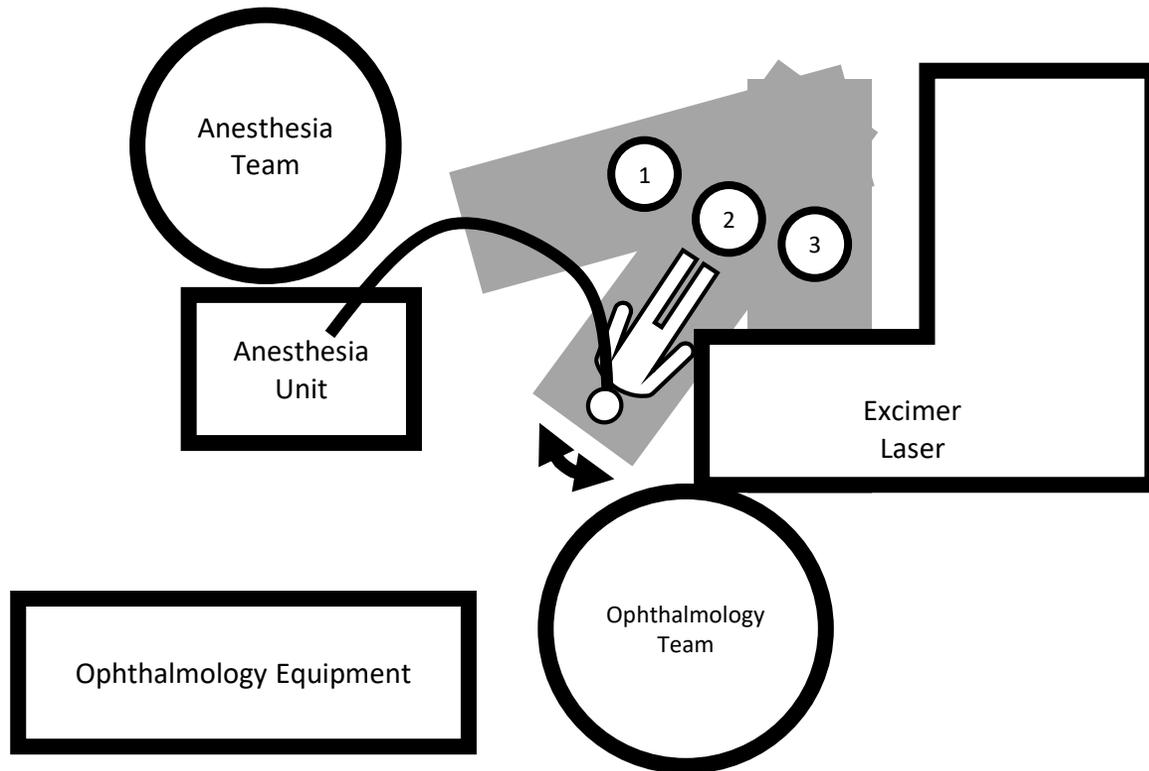


Patient case 1

- CC: Anisometropia, intermittent eye-crossing, spectacle and patching non-compliant
- PMHx: 3-year-old male with autism spectrum disorder and global developmental delay
- PSHx: Bilateral medial rectus recession
- Cycloplegic refraction
 - OD +1.50+1.50x110
 - OS +3.50+1.00x70
- Normal anterior and posterior segment exam



Laser keratorefractive surgery





+Y
ActiveTrak OFF

NOZZLE OUT OF POSITION

PRK 22 months post-op

- Mother reports:
 - Eye alignment improved
 - Patient is more playful
 - No more fighting to wear spectacles
- Cycloplegic refraction
 - OD +0.50+2.00x90
 - OS +1.00+2.00x90

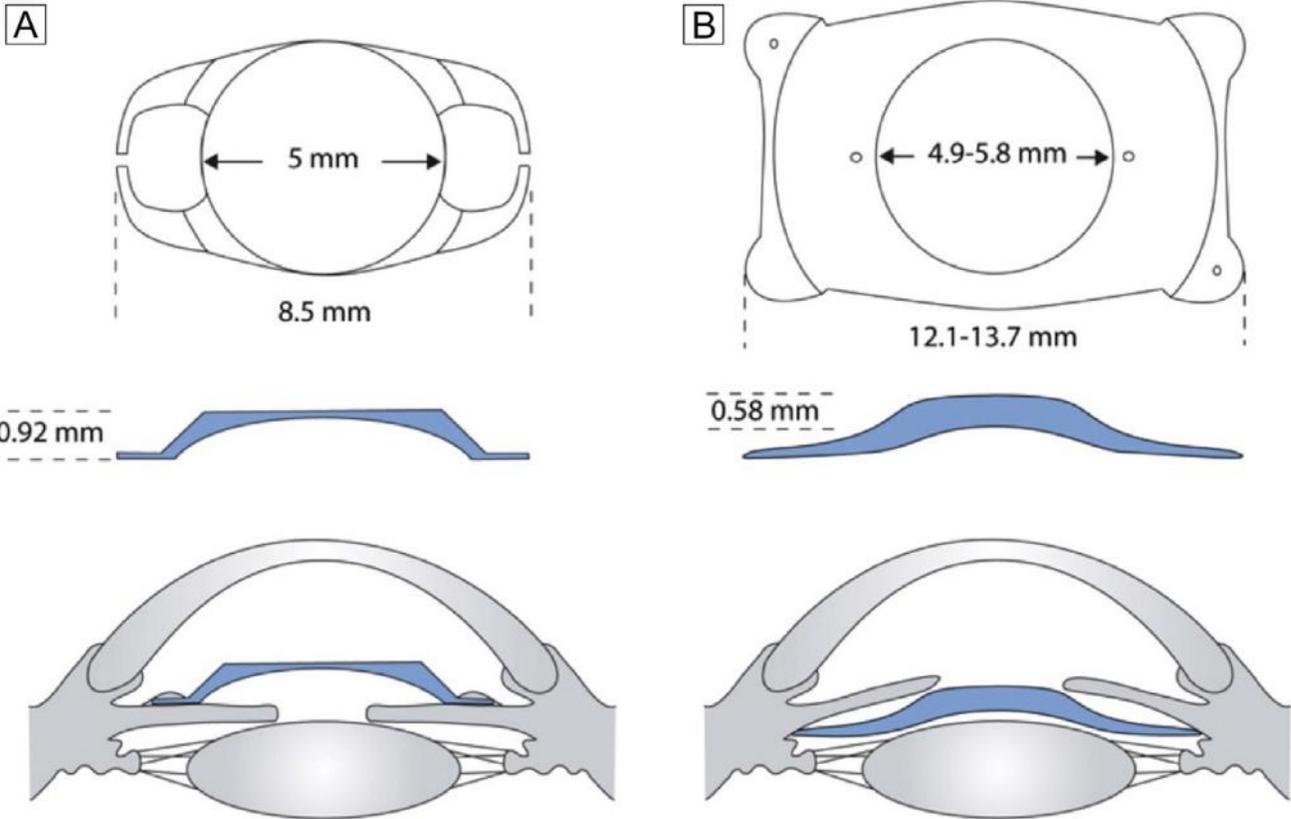


Patient case 2

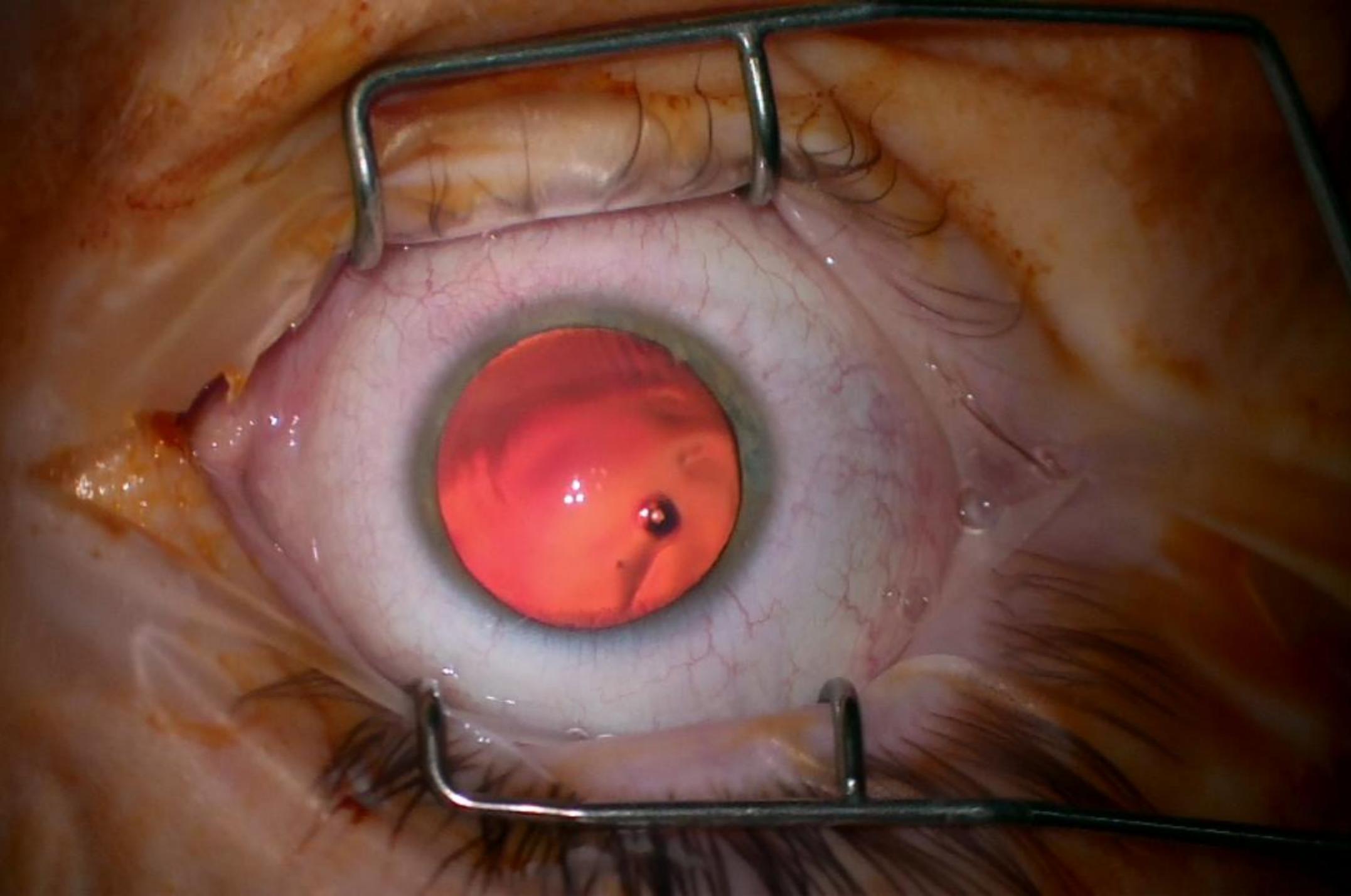
- CC: Pathologic myopia, spectacle non-compliant
- PMHx: 13 year-old male with Angelman syndrome, developmental delay, non-verbal, horizontal jerk nystagmus
- Cycloplegic refraction
 - OD -19.50+1.00x90
 - OS -16.50+1.50x90
- Normal anterior and posterior segment exam

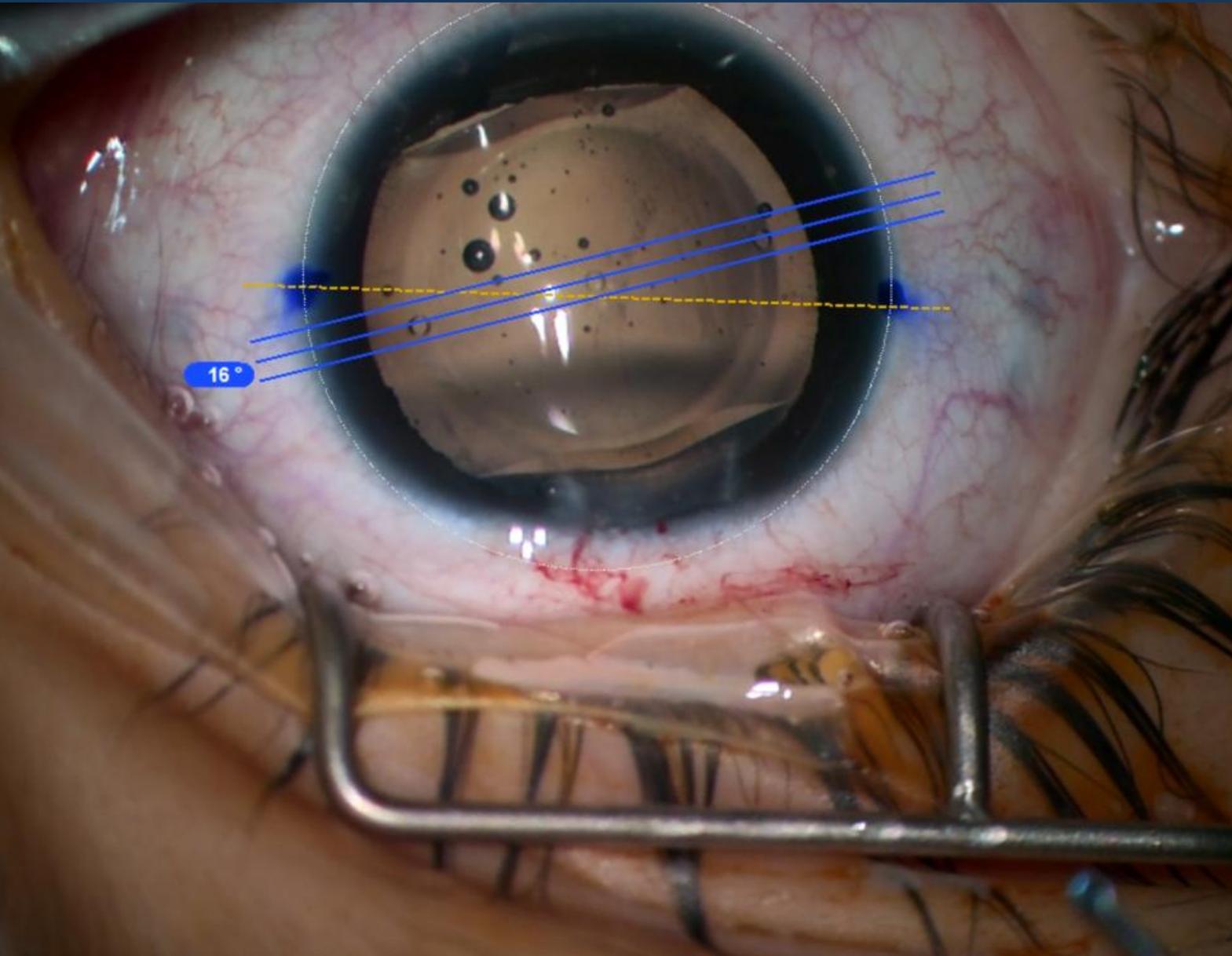


Phakic intraocular lens



Faron N, Hoekel J, Tychsen L. Visual acuity, refractive error, and regression outcomes in 169 children with high myopia who were implanted with Ophtec-Artisan or Visian phakic IOLs. *J Am Assoc Pediatric Ophthalmol Strabismus*. 2021;25:27.e1-27.e8.





Phakic intraocular lens



ICL 3 months post-op

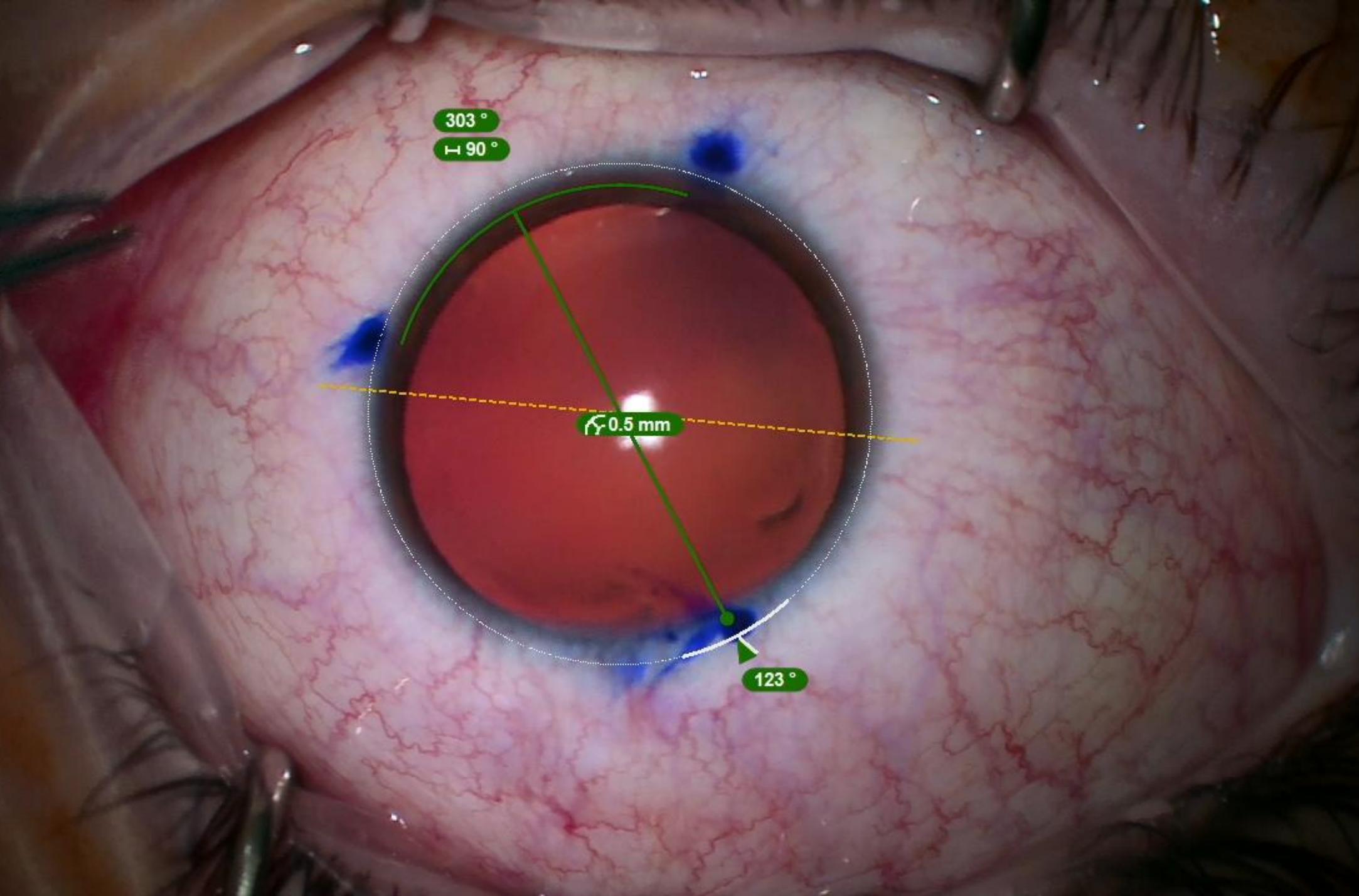
- Father reports:
 - Patient is more interactive and interested in his surroundings
- Cycloplegic refraction
 - OD $-3.50+1.50 \times 100$
 - OS $-2.50+2.00 \times 80$



Patient case 3

- 12 year-old male with pathologic myopia of both eyes
- Visual distortion and refractive amblyopia from high-powered spectacles
- BCVA
 - OD 20/30
 - OS 20/80
- Cycloplegic refraction
 - OD $-21.25+4.75 \times 115$
 - OS $-22.00+2.75 \times 80$





303°

← 90°

0.5 mm

123°

RLE 7 months post-op

- Patient completing all tasks without spectacles
- UCVA
 - OD 20/30
 - OS 20/60
- Cycloplegic refraction
 - OD $-2.25+0.50 \times 103$
 - OS $-1.00+1.75 \times 36$



Summary

Pediatric refractive surgery addresses refractive errors and their associated comorbidities such as amblyopia and strabismus in special needs children intolerant of spectacles or contact lenses.

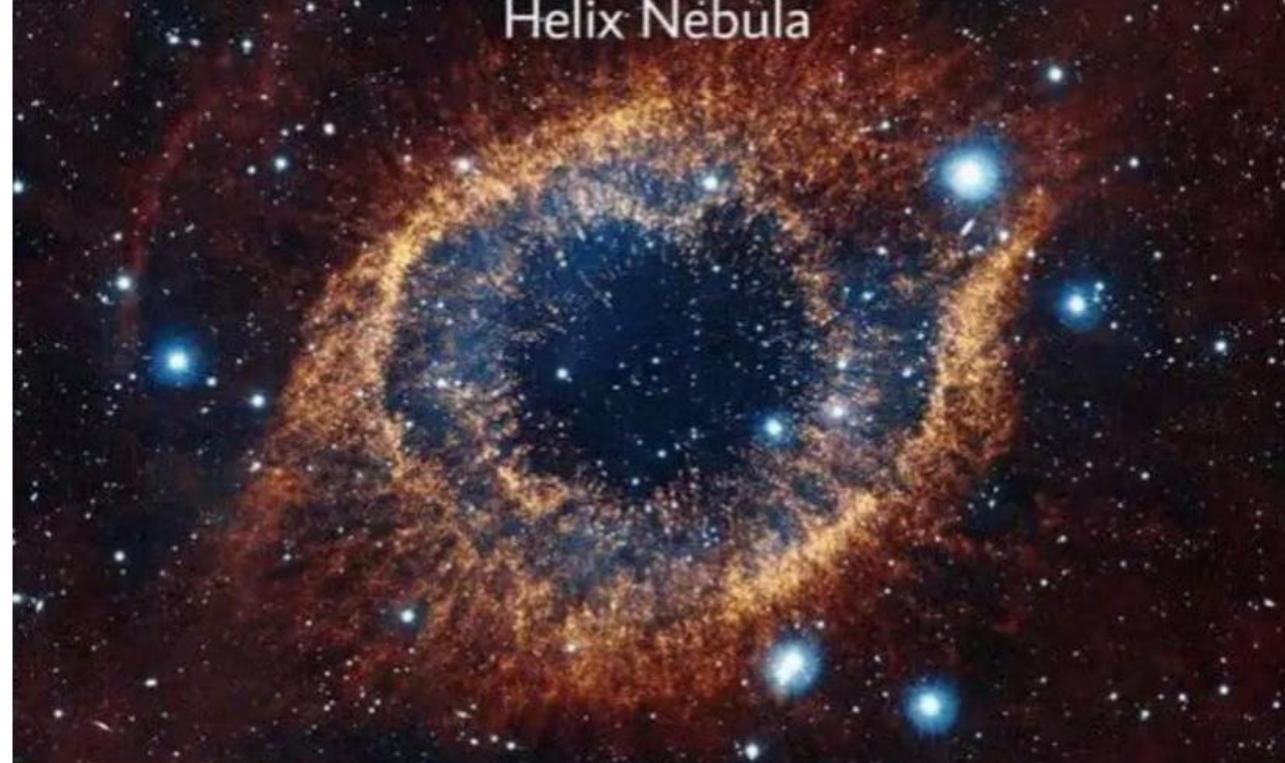
Pediatric refractive surgery involves modification of refractive errors at the corneal, anterior chamber, posterior chamber, and lens planes.

Children with neurobehavioral disorders undergoing refractive surgery have improvements in visual acuity, communication, socialization, motor skills, adaptive behaviors, visual perception, and cognitive function.



Thank
you!

Helix Nebula



Human Eye



Extra slides

