

# Optimizing IOL selection: Focus on IOL calculations in “difficult” eyes

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# A conversation between:



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# Learning objectives

**Describe the preoperative assessment of ocular health in patients scheduled for cataract surgery**

**Discuss biometry and IOL calculations to achieve optimum postoperative refractive outcomes in cataract patients**

**Recognize how previous refractive surgeries and corneal pathologies in cataract patients impact biometry, IOL calculations and lens selection**

# What must we include in the preoperative assessment of patients scheduled for cataract surgery?

**Dr Karolinne Rocha**

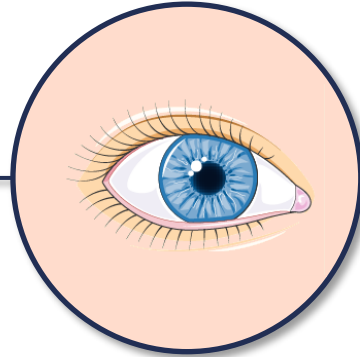
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# Preoperative evaluation

## 1. History

- ✓ Prior ocular health
- ✓ Prior refractive surgery
- ✓ Current symptoms
- ✓ Visual goals



## 2. Examination

- ✓ Eyelids
- ✓ Cornea
- ✓ Iris
- ✓ Conjunctiva and sclera
- ✓ Anterior chamber
- ✓ Posterior segment
- ✓ Lens

## 3. Testing

- ✓ Topography
- ✓ Biometry
- ✓ Astigmatism correction plan
- ✓ OCT macula

## 4. Counselling

- ✓ Education
- ✓ Risks
- ✓ Informed consent

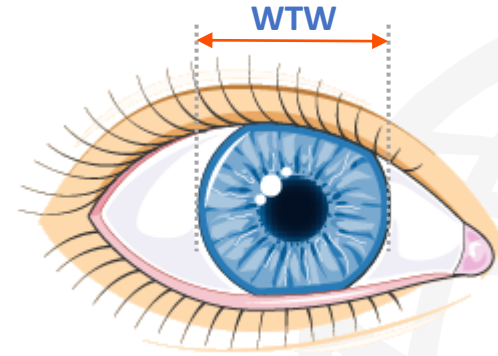
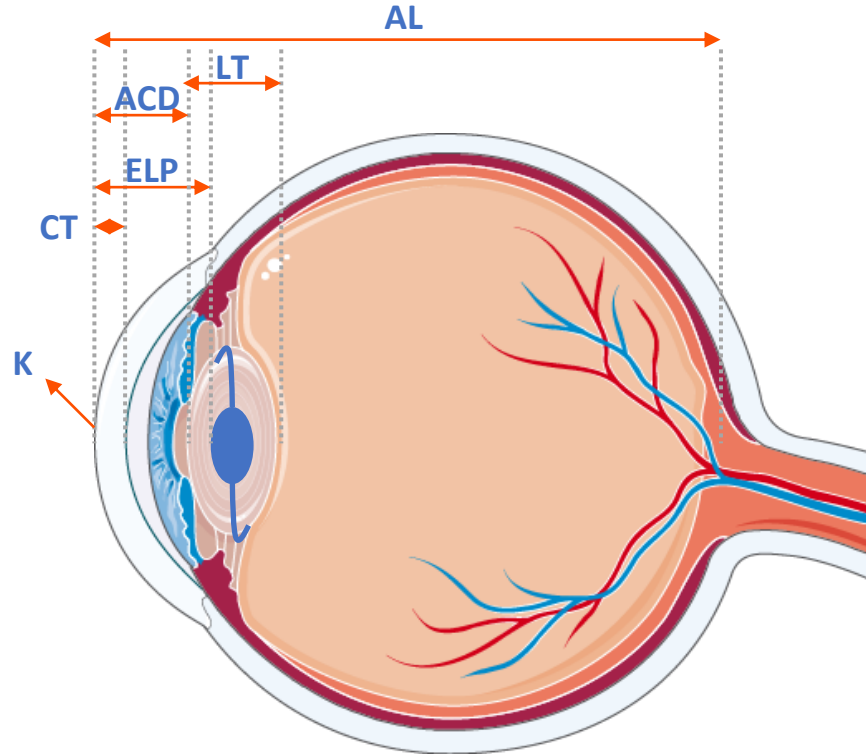
# How do we optimize biometry and IOL calculations for best postoperative refractive outcomes in cataract patients?

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# Preoperative measurements



ACD	Anterior chamber depth
AL	Axial length
CT	Corneal thickness
ELP	Effective lens position
K	Central corneal power
LT	Lens thickness
WTW	White-to-white distance

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1. Khoramnia R, et al. *Diagnostics (Basel)*. 2022;12:243; 2. Goodman C. 2022. Available at: <https://morancore.utah.edu/section-11-lens-and-cataract/essentials-of-biometry-part-1-what-ocular-parameters-are-important/> (accessed 17 July 2023).



# IOL power calculations by axial length

	Short	Normal	Long	
Vergence formulas	Different lens constant	<b>HOLLADAY I</b>	W-K axial length adjustment	Normal anterior segment anatomy
		<b>HOFFER Q</b>	Not typically used for high axial myopes	
		<b>SRK / T</b>	W-K axial length adjustment	
Ray tracing	aO a1 a2 optimized	<b>HAIGIS</b> Only aO optimized	W-K axial length adjustment aO a1 a2 optimized	All anterior segment types
	Different lens constant	<b>HOLLADAY II</b>	W-K axial length adjustment	
		<b>OLSEN C</b>	Requires ACD and LT by optical biometry	
Vergence formula		<b>BARRETT II</b>	Excellent for minus power meniscus design IOLs	
AI		<b>HILL-RBF</b>	Use only with 'in-bounds' indication	

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ACD, anterior chamber depth; AI, artificial intelligence; IOL, intraocular lens; LT, lens thickness; W-K, Wang-Koch.

1. American Academy of Ophthalmology. Available at: [www.aao.org/education/bcscsnippetdetail.aspx?id=0a9daa10-d43a-49f4-841e-39d1cb3e5c6a](http://www.aao.org/education/bcscsnippetdetail.aspx?id=0a9daa10-d43a-49f4-841e-39d1cb3e5c6a) (accessed 17 July 2023);

2. East Valley Ophthalmologists. Available at: <https://doctor-hill.com/iol-power-calculations/formulas/> (accessed 17 July 2023).

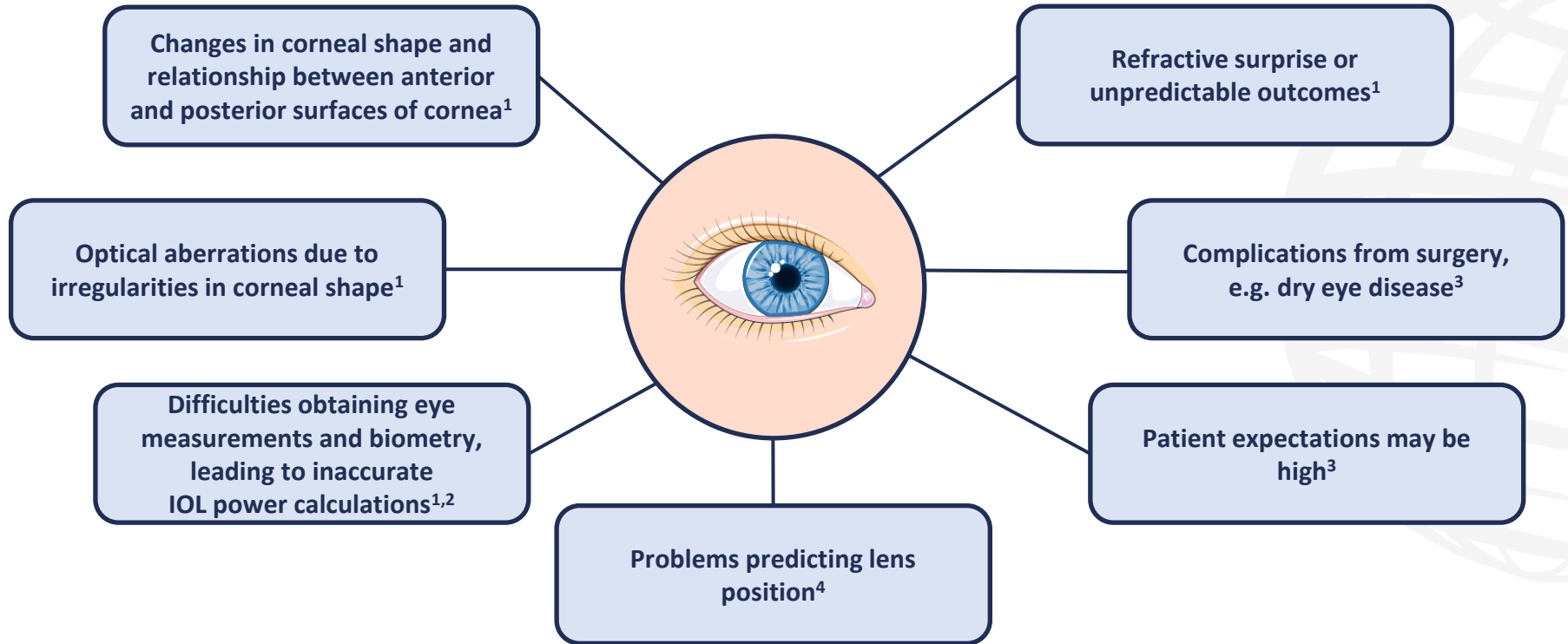
# How do previous refractive surgeries and corneal pathologies in cataract patients impact biometry, IOL calculations and lens selection?

**Dr Karolinne Rocha**

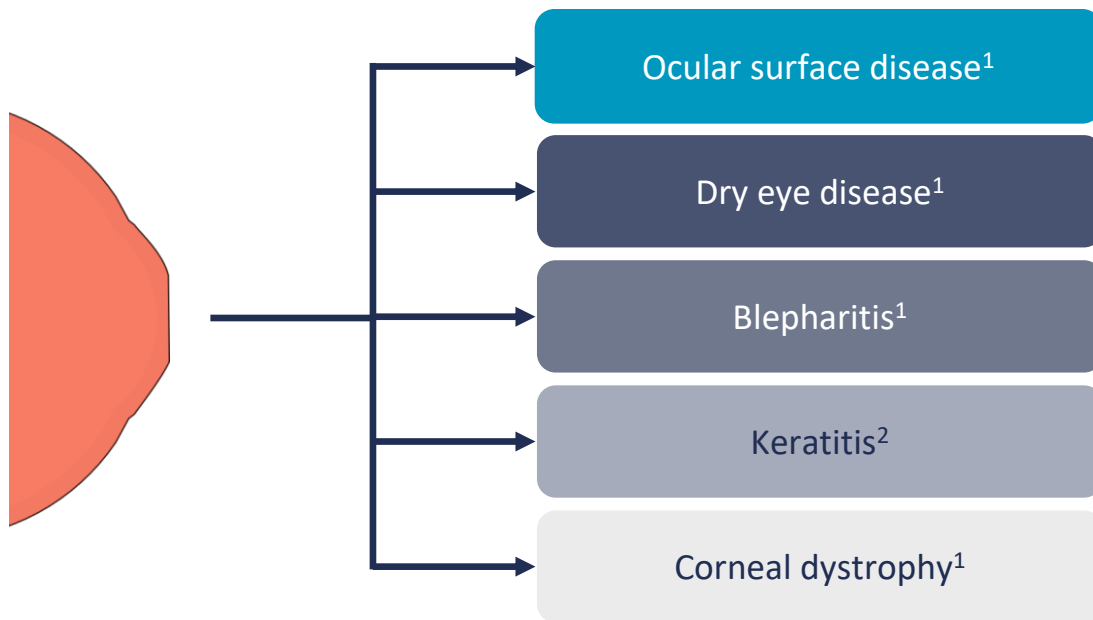
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# Previous refractive surgery: Considerations



# Common corneal pathologies



# Considerations for corneal pathologies



## Before surgery

- Be aware that the accuracy of measurements and IOL calculations are reduced<sup>1</sup>
- Assess for and treat corneal comorbidities before cataract surgery<sup>2,3</sup>
- Corneal testing is not routine for cataract surgery, but should be considered<sup>1,4</sup>
- Educate the patient<sup>3,5</sup>
- Make appropriate IOL selection<sup>3</sup>



## During surgery

Limit intra-operative surgical factors that may damage ocular surface<sup>2</sup>



## After surgery

Choose appropriate postoperative management to optimize outcomes<sup>2</sup>

IOL, intraocular lens.

1. Miller KM, et al. *Ophthalmology*. 2022;129:1–126; 2. Naderi K, et al. *Eur J Ophthalmol*. 2020;30:840–55; 3. Yeu E, Cuozzo S. *Ophthalmology* 2021;128:e132–41;

4. Loh J. *US Ophthalmic Review*. 2015;8:92–5; 5. Wisely CE, et al. *Clin Ophthalmol*. 2020;14:1365–71.