

**BSCRS**

**2003**

**I O L Calculations  
after  
Refractive Surgery**

**BSCRS Meeting**

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## **Introduction**

- **Unprecedented levels of refractive accuracy**
- **Biometry**
- **Formulas**
- **Clinical variables**

## Biometry

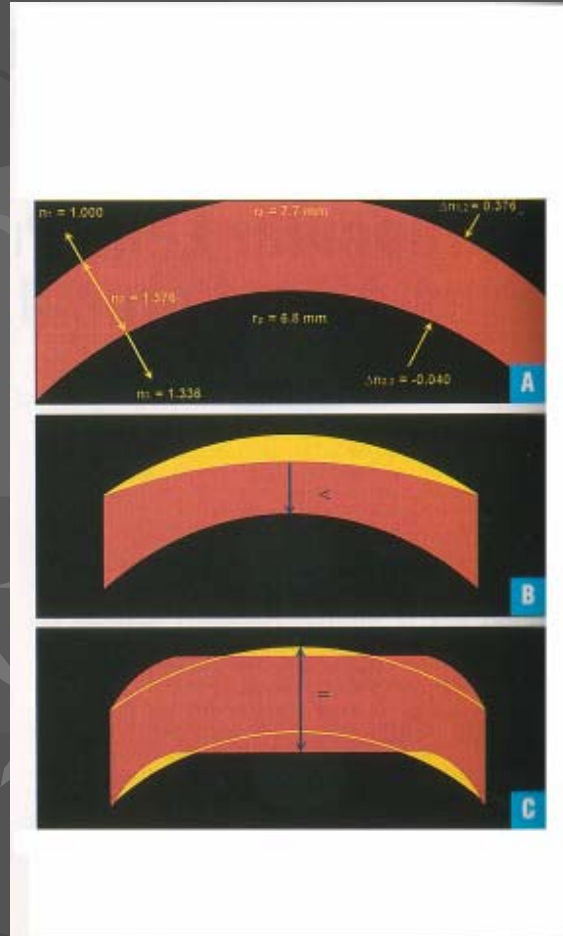
- Accurate axial length
- Measure both eyes
- Errors in AL are most significant:  $\pm 2.5$  D
- $\pm 1.75$  D in long eyes :  $> 30$  mm;  $\pm 3.75$  D in short eyes :  $< 21$  mm
- Use A-Scan with real-time screen
- Experienced technician
- Appropriate US velocities values
- B-Scan backup ?

## Biometry : corneal power

- Critical: 1 D of keratometric error  $\rightarrow$  1 D of IOL power calculation error.
- Previous refractive surgery : std measurements overestimate corneal power.
- RK flattens front and back surfaces of the cornea.
- PRK & LASIK flatten only the front surface of the cornea  $\rightarrow$  change the refractive index calculation, overestimating the corneal power by 1 D for every 7 D of refractive surgery correction obtained.

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# Corneal Power after Refractive Surgery



## Corneal Power

- Most keratometers measure only at the 3.2 mm zone of the central cornea, which misses the central flatter zone of effective corneal power.
- 4 methods to measure:
  - Clinical history method
  - Contact lens method
  - Videotopography
  - Keratometer

## Clinical history method

- Final change in RE < change in effective corneal power
- Present effective corneal power = this change + presurgical power
- $K = K_{preop} + R_{preop} - R_{postop}$





## Contact lens method

- HL of plano power (P) and a base curve (B) = effective power of the cornea will not change the refraction
- Manifest refraction with lens or without = O
- $K = B + P + R_{cl} - R_{nocl}$

## Cataract & RK

- Just after cataract surgery, cornea flattens
- « hyperopic shift »
- Wait 3 months
- Warn the patient
- Be ready for a lens exchange

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## **IOL position**

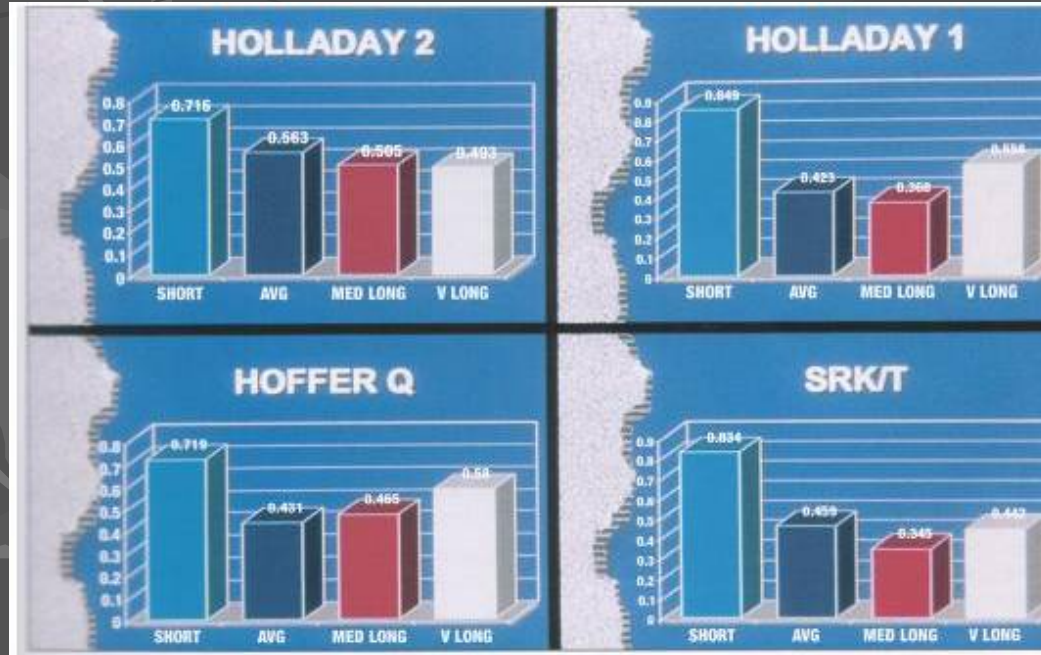
- Placement in the bag or in the ciliary sulcus
- IOL power should be decreased by 0.75 to 1.25D

## FORMULAS

- Holladay 1 most accurate in 24.5 – 26 mm
- SRK/T most accurate in long eyes:  $> 26$  mm
- Short eyes: Hoffer more accurate
- Holladay 2 = Hoffer Q in short eyes
- Not as accurate in long eyes

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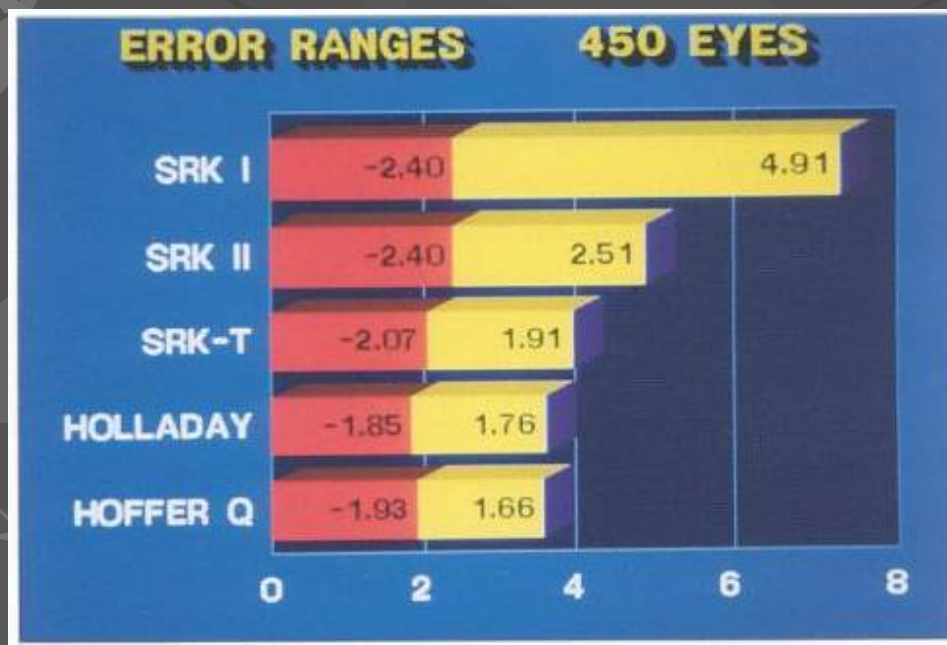
# FORMULAS (study by Hoffer)



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## Errors







## **Clinical variables**

- **Patients needs and desires**
- **Monocular cataract**
- **Multifocal IOL : hyperopia is better for multifocal IOL than myopia**

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## **Conclusion**

**IT IS NOT THE HOLY GRAIL !**

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**20/20/20/20**



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**Thank you for your attention**

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