

Cataract and Refractive Surgery Patients: Still Two Different Breeds ?

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Financial Disclosure

- I do not have any financial interests or relationships to disclose.



Why are we here today ?

It used to be that...

- Cataract surgery patient:
 - Had poor vision
 - Had a disease
 - Was happy simply with seeing again
 - Residual spherical refractive error within 1.00 D was not a problem
 - Residual astigmatism was not a problem
 - Glare and halos were not a problem
 - Near vision ? Spectacles !
 - Contrast sensitivity !?!
 - Life expectancy and activities limited

It used to be that...

- Refractive surgery patient:
 - Had excellent vision with CL
 - Had a handicap, not a disease
 - Was happy with very good vision... maybe
 - Residual spherical refractive error within 0.50 D was a problem
 - Residual astigmatism was a severe problem
 - Glare and halos were a horrible problem
 - Excellent life expectancy, full activity

Therefore in Refractive Surgery...

- Aberrometry was mutated from astronomy
- “Custom” was developed
- Manic attention is devoted to :
 - Definition of refractive effect
 - Pupil size
 - Corneal curvature
 - Surgical strategy
 - Centration

Cataract Surgery is Becoming a Refractive Surgery

- Different IOL types for different situations:
 - Multifocal (diffractive, refractive)
 - Aspheric (wavefront IOLs, being spherical aberration the main aberration encountered in pseudophakic eyes)
 - Toric
 - Accomodating

Guirao A, Arch Ophthalmol, 120: 2002

Holladay JT, J Refract Surg, 18: 2002

Cataract Surgery is Becoming a Refractive Surgery

- Extensive use of instruments for preoperative patient evaluation:
 - IOLMaster
 - Aberrometers (MTF, PSF)
 - Anterior segment OCT
 - Posterior segment OCT

Cataract Surgery is Becoming a Refractive Surgery

- Patient's psychology is changing:
 - Expectations are increasing exponentially
 - Cataract surgery is always successful
 - Distance vision must be excellent, no correction
 - No residual sphere
 - No residual or induced astigmatism
 - Near vision... Will I really still need spectacles for reading ?

Cataract vs. or Equal to Refractive Surgery ?

- Cataract surgery: extreme standardization
- Refractive surgery: customization
- Final frontier of refractive AND cataract surgery: **presbyopia correction**


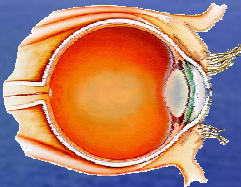
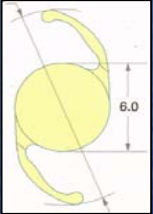
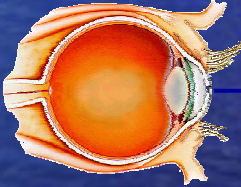



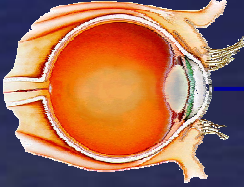
Spherical Aberration

- Special attention:
 - All multifocal approaches involve diverting some of the light rays that would be otherwise focused on the fovea by infinity to fall into focus from a reading distance
 - Almost the equivalent of inducing SA
 - Multifocal IOL or ablation induce SA
 - SA improves depth of focus
 - Similarly to nuclear cataract induces a multiplicity of foci
 - Situation CAN be simulated with CL before LASIK, not before cataract surgery

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Depth of focus for yellow and blue and red at a 10% threshold of Strehl ratio

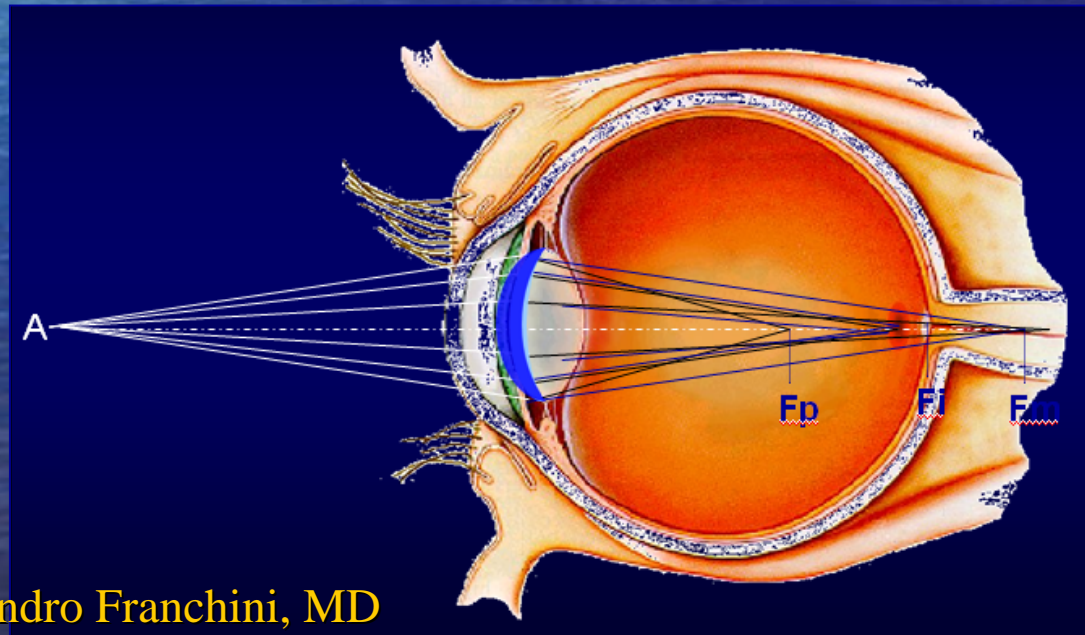
		D of f (mm)	Distinct vision
Tecnis (A.M.O.)		0.09	 3.3 m → ∞
I.Q. (Alcon)		NV	 → ∞
SofPort (Bausch & Lomb)		NV	 → ∞
AQ-310Ai (Canon-Staar)		0.06 5	 4.45 m → ∞



Conclusions

The results obtained show that:

1. it is insufficient to design an **aspherical lens** which maintains a certain degree of **spherical aberration** in order to obtain a certain degree of pseudoaccommodation.
2. The quantity of light focused along the optical axis in front and behind the retina does not guarantee sufficient illumination
3. It is useful only to decrease the quality of the main image



Courtesy of Alessandro Franchini, MD

Surgeon's Mentality

- Patient mentality has changed
- The surgeon must adapt and change is mentality as well
- Concepts and approaches typical of refractive surgery must now be applied to cataract surgery
- These changes will be matter of survival in the near future...

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Thank you for Your Attention !



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