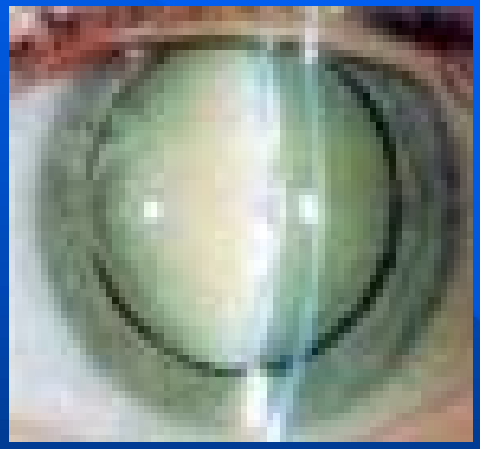
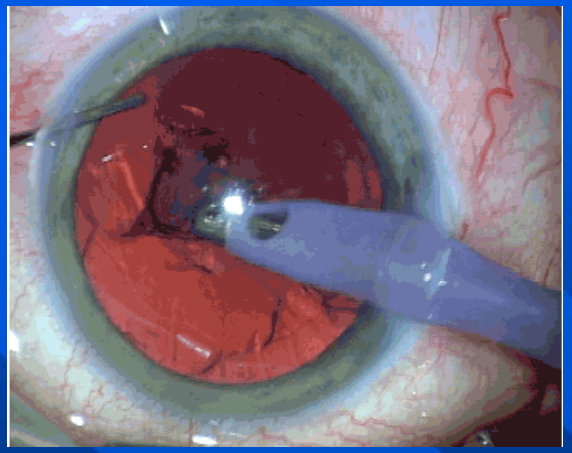
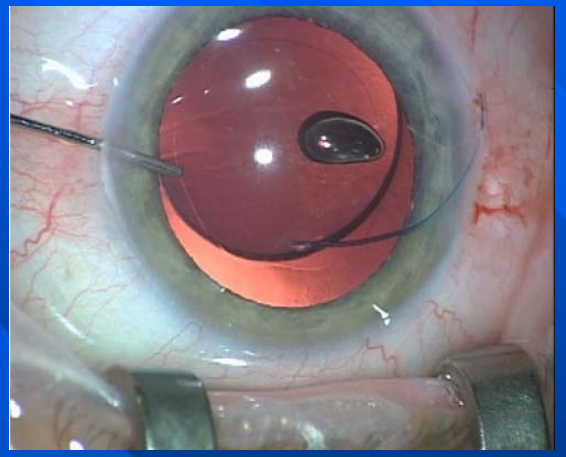
Clinical Update for Presbyopic Lens Options

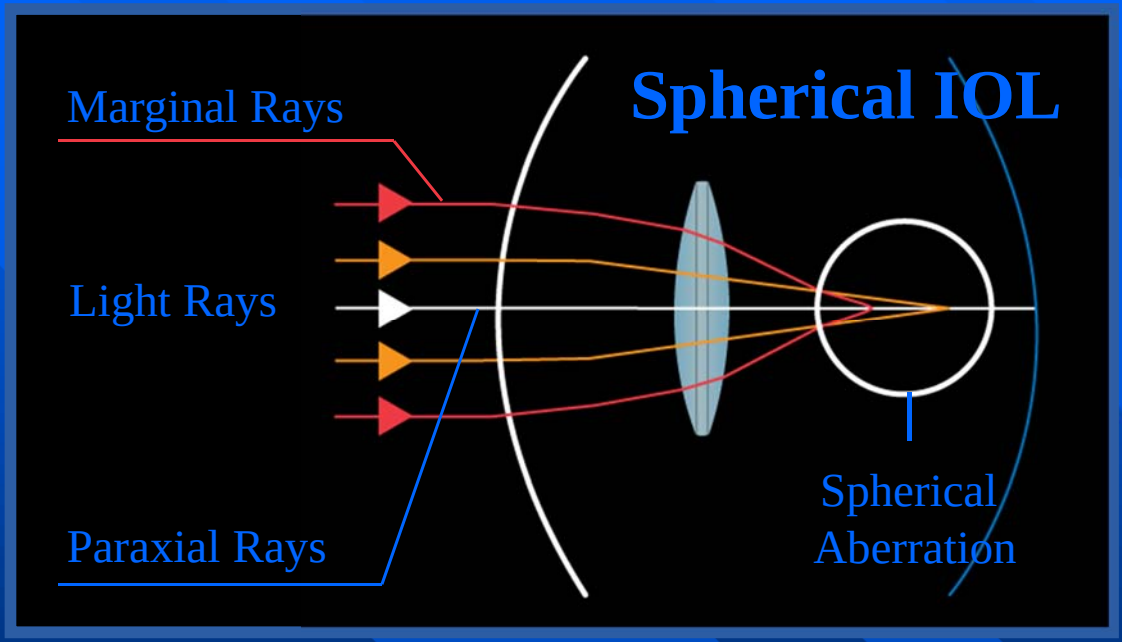




Gregory D. Searcy, M.D.

Erdey Searcy Eye Group

Columbus, Ohio

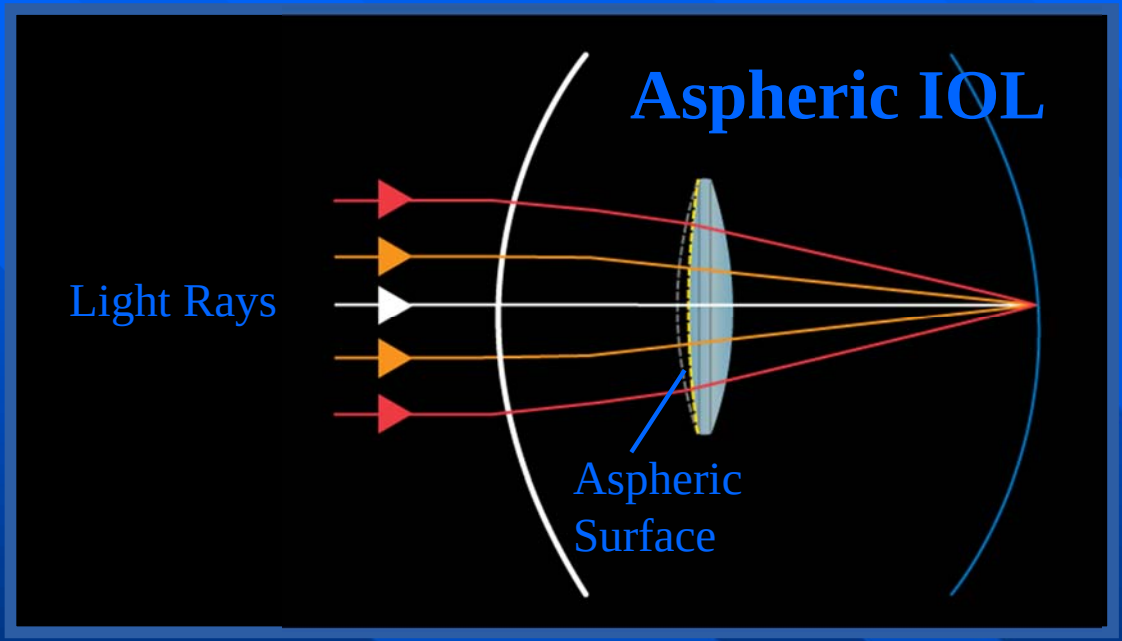
The Problem = Spherical Optics



- Spherical aberration:
  - Light rays are over-refracted at periphery of a lens system
  - Result: Region of defocused light = decreased image quality

*Smith, G., Atchinson D.A., (1997) The Eye and Visual Optical Instruments. Cambridge University Press, Cambridge, United Kingdom, pp. 667.

The Solution = Aspheric Optics



- Aspheric optics:
  - Aligns the light rays to compensate for positive corneal SA
  - More coincident focus of light rays = better image quality

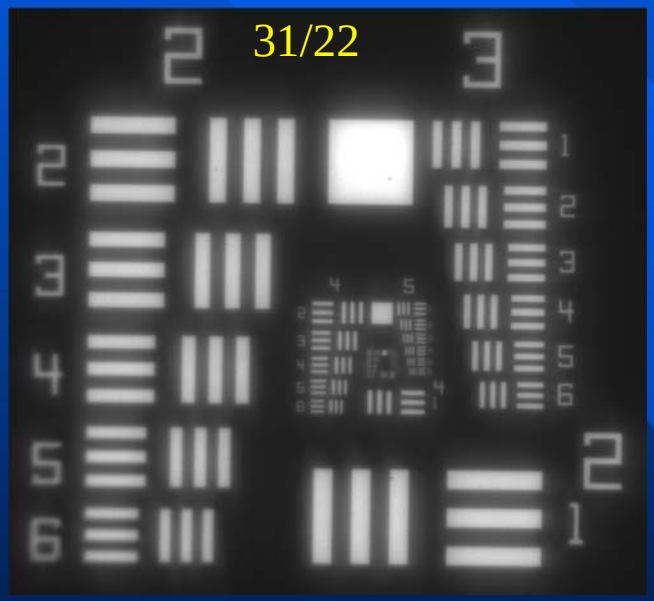
*Smith, G., Atchinson D.A., (1997) The Eye and Visual Optical Instruments. Cambridge University Press, Cambridge, United Kingdom, pp. 667.

The Solution = Aspheric Optics

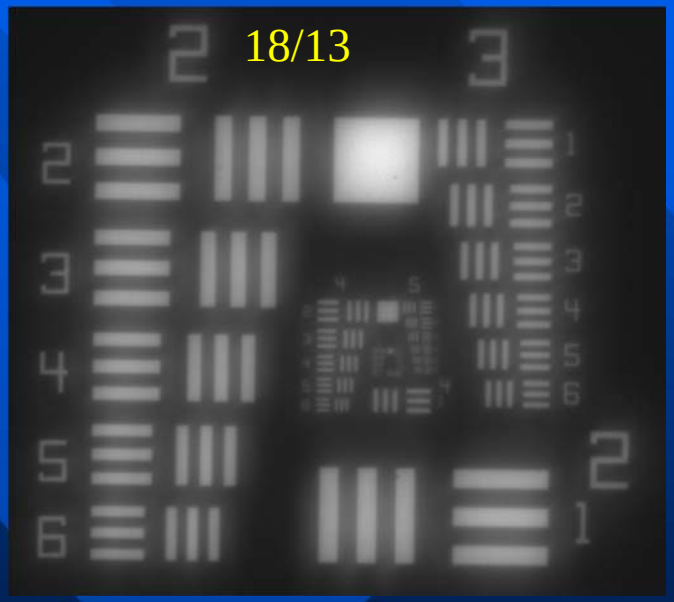
- Negative Asphericity:

  Better contrast sensitivity: Better UCVA at Distance

  Worse depth of field: Worse UCVA at Near



ReSTOR Aspheric



ReSTOR Non-Aspheric

Simulated Image Contrast Enhancement by Aspheric Correction

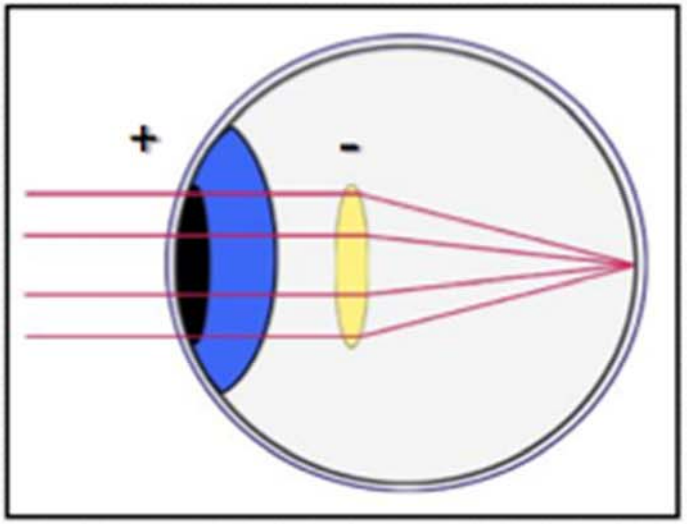
Spherical Aberration

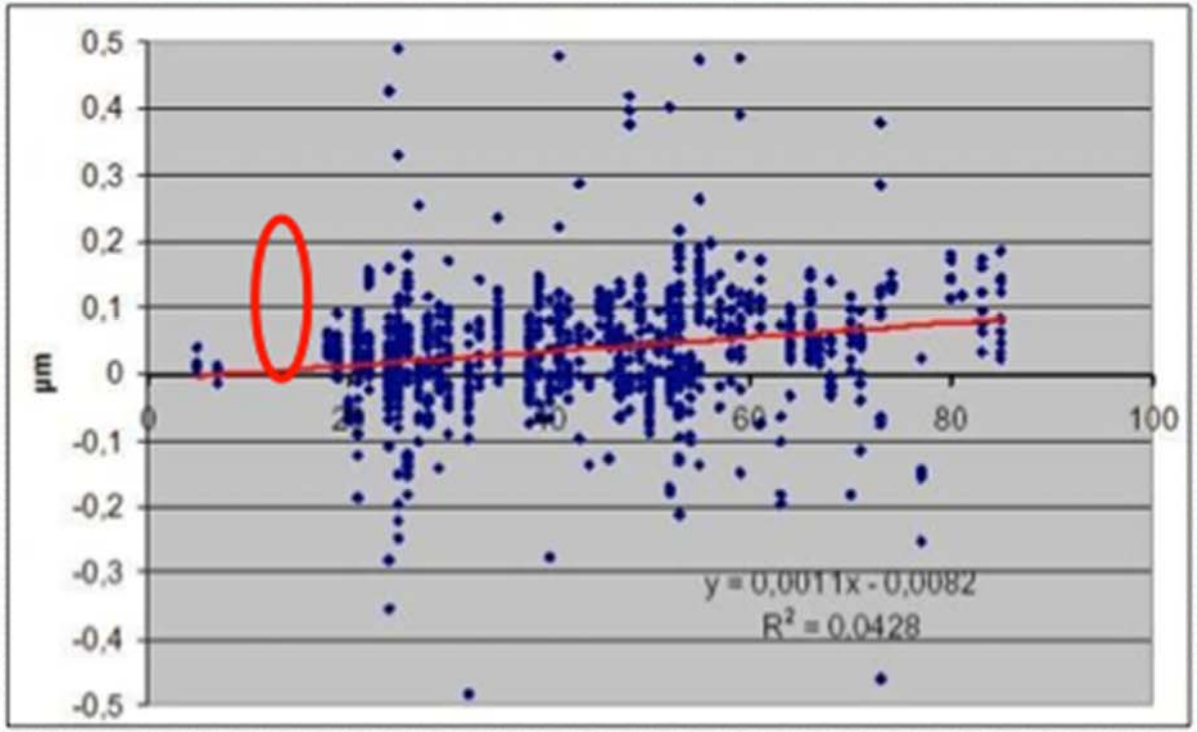
Aspheric Correction

- Benefits realized when pupil 4 to 5 mm
- Ex: Night driving; dim light (mesopic)

The Youthful Eye

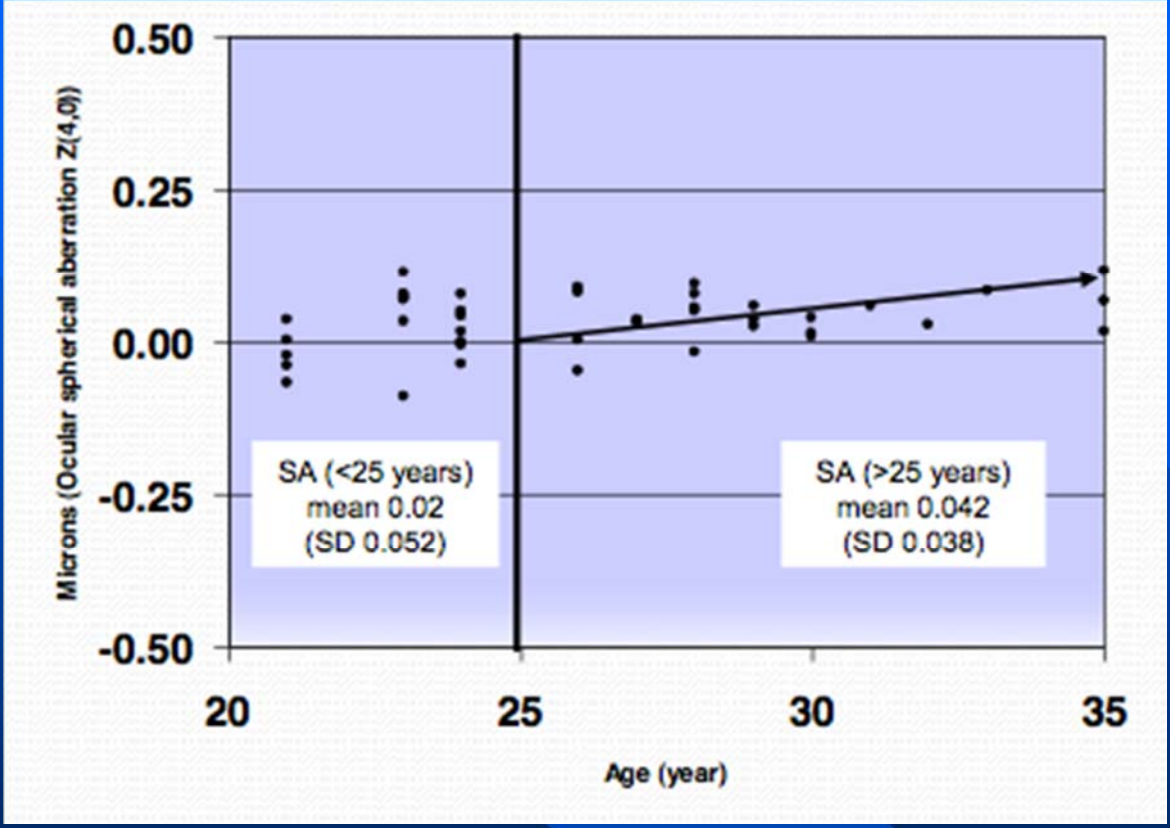
- Positive spherical aberration of the cornea is balanced by negative spherical aberration of the young crystalline lens
  - The young eye has essentially zero spherical aberration at age 19
  - Light is sharply focused on the retina, producing a quality image and good functional vision





*Guirao A, et al. *J Opt Soc Am A.* 2000;17:1697-1702. **Holzer M. Presented at DOC, 2006.

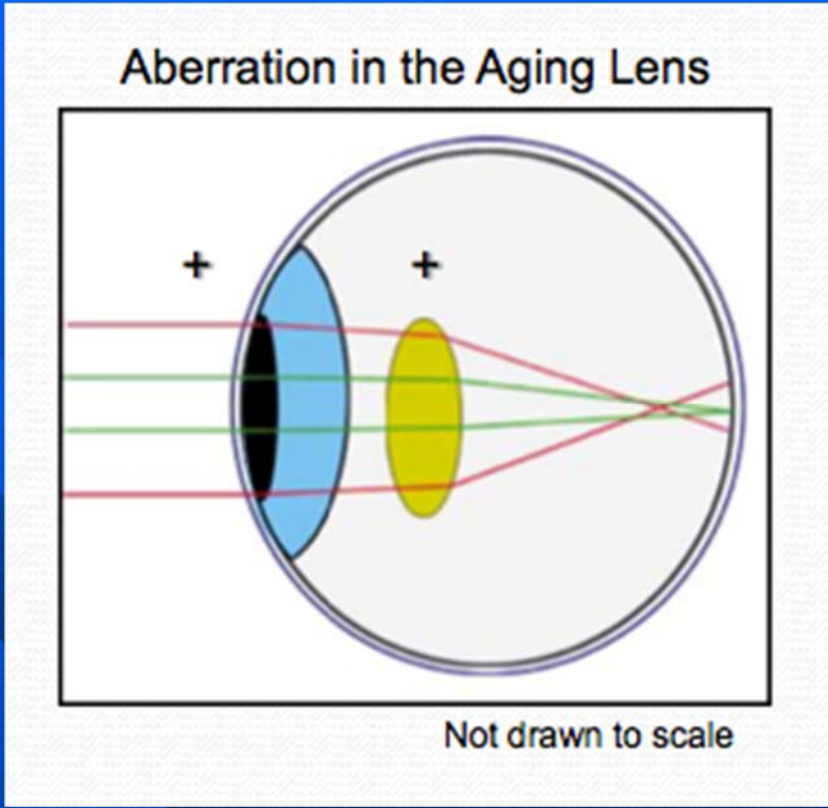
The Youthful Eye



- Peak visual performance occurs at age 19
- Contrast sensitivity and quality of vision are the best

The Aging Eye

- Functional vision is reduced as the aging crystalline lens gains positive spherical aberration, can no longer compensate for positive corneal spherical aberration
- Aging eye has positive spherical aberration
- Positive spherical aberration causes blurred vision, reduced contrast sensitivity and functional loss
- Onset of cataract exacerbates the problem

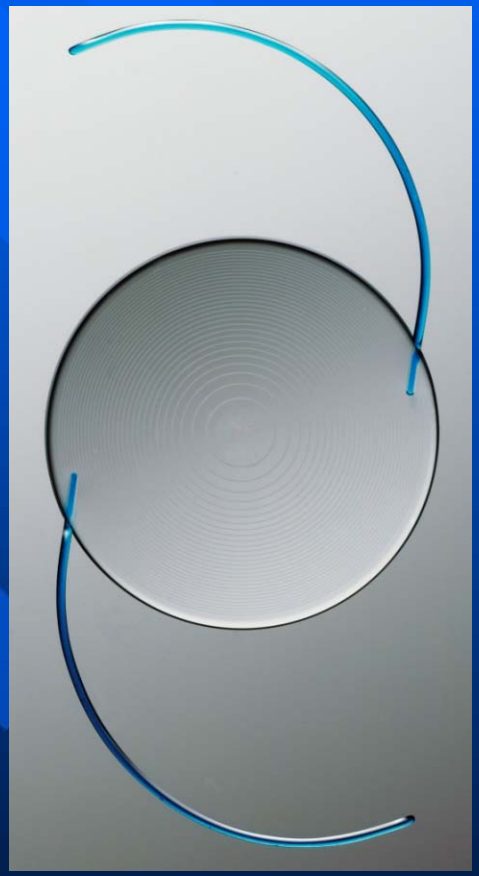


Presbyopia Correcting IOLs
Now all are aspheric

Crystalens AO 0

ReSTOR +3 -0.1

ReSTOR +2.5 -0.2



TECNIS MF -0.27

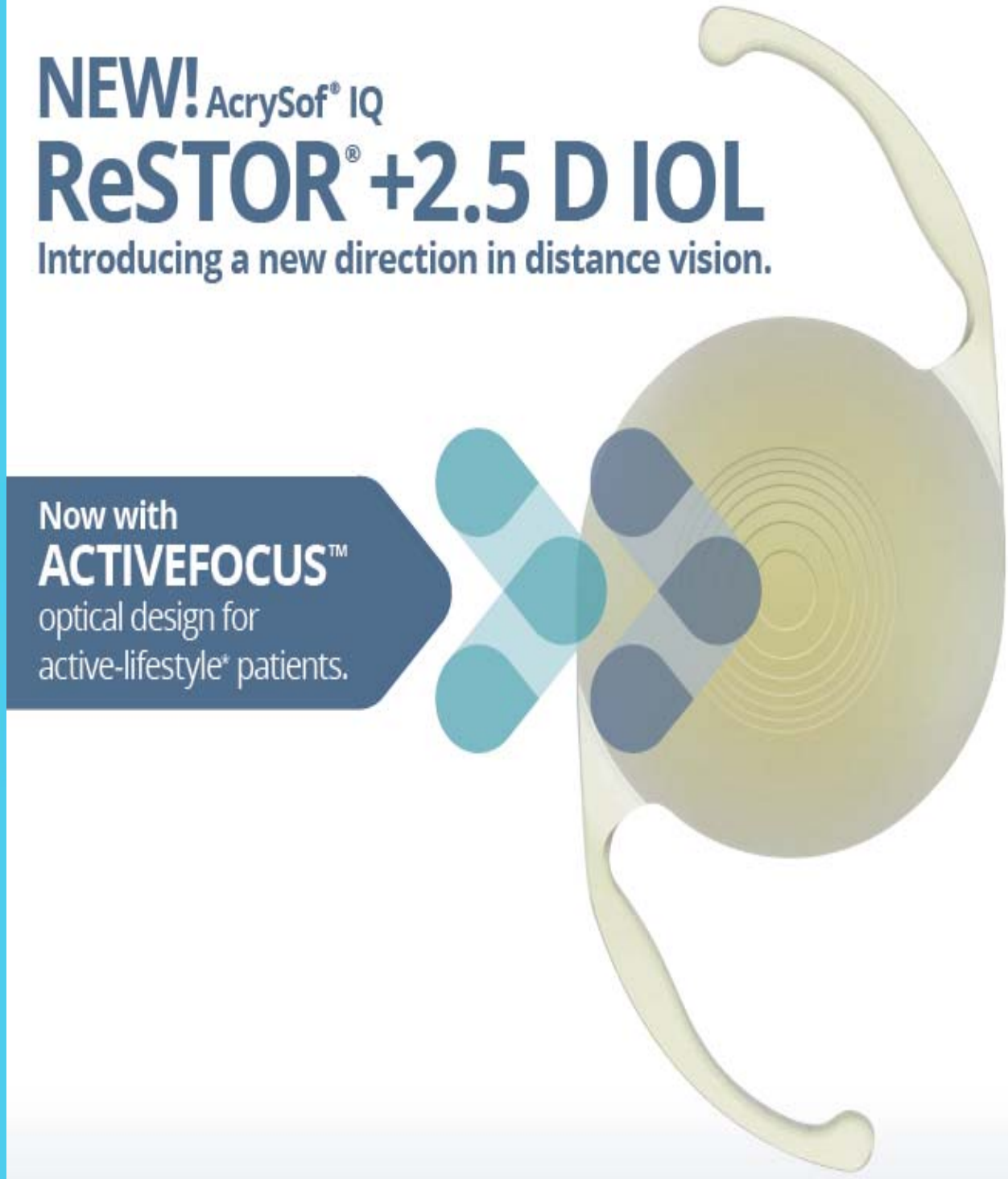
+4 +3.25 +2.75

ReSTOR® +2.5 is designed to deliver sharp distance vision for more active-lifestyle patients, such as those participating in golf, tennis, theater and driving.

ACTIVEFOCUS

= apodized diffractive optic with:

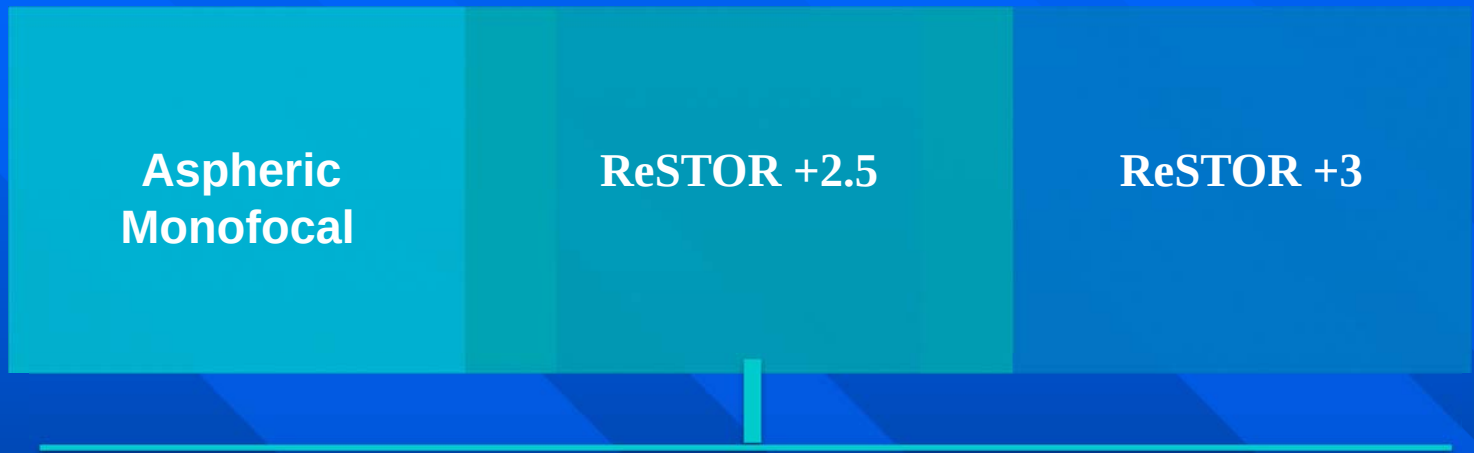
- **Fewer steps**
- **Central refractive zone for distance**
- **Increased negative asphericity**



SV25T0 AcrySof IQ ReSTOR +2.5 D

SV	Sharp Vision
25	+2.5 D add
T	Toric
0	Zero astigmatic correction

Best Patients for ReSTOR +2.5



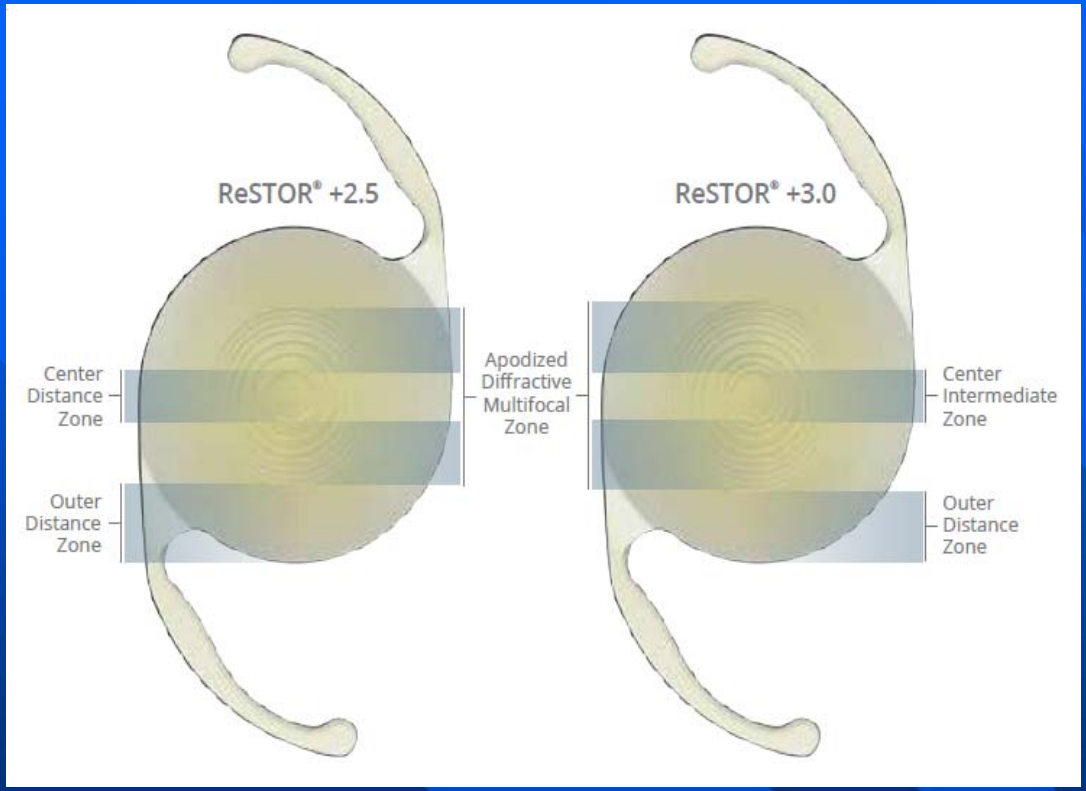
The ReSTOR +2.5 Patient

- Active lifestyle demanding intermediate (53cm/21in) + distance (4m/13ft) vision
- Not willing to compromise distance for a full range of vision
- Desires more opportunity for a range of vision versus monofocal
- Desires increased spectacle independence at 21 inches and beyond
- Patient understands that +1.00 readers may be needed for 16-20 inches (40-50cm)

Best Patients for ReSTOR +3

- Broad range of vision
- Balance of activities at near, intermediate, & distant focal points
- Patient seeks true performance at all distances from multifocal capabilities: desires full range of vision from 16 inches (40 cm) to distance with greatest opportunity of spectacle independence at all distances

Optic Design Differences: ReSTOR +2.5 vs ReSTOR +3.0



Reduced the add power to 2.5 from 3.0 D :

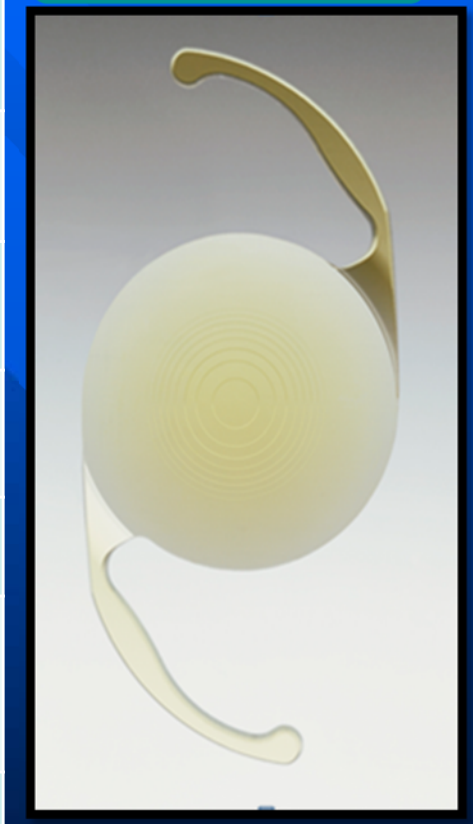
- Reducing diffractive steps to 7 instead of 9 with increased spacing
- Altered the light distribution by:
  - Increasing the distance energy of the center zone from 40% to 100%
  - Reducing apodized diffractive area by 18%
  - Increasing the outer distance area by 6%

Optic Design Differences: ReSTOR +2.5 vs ReSTOR +3.0

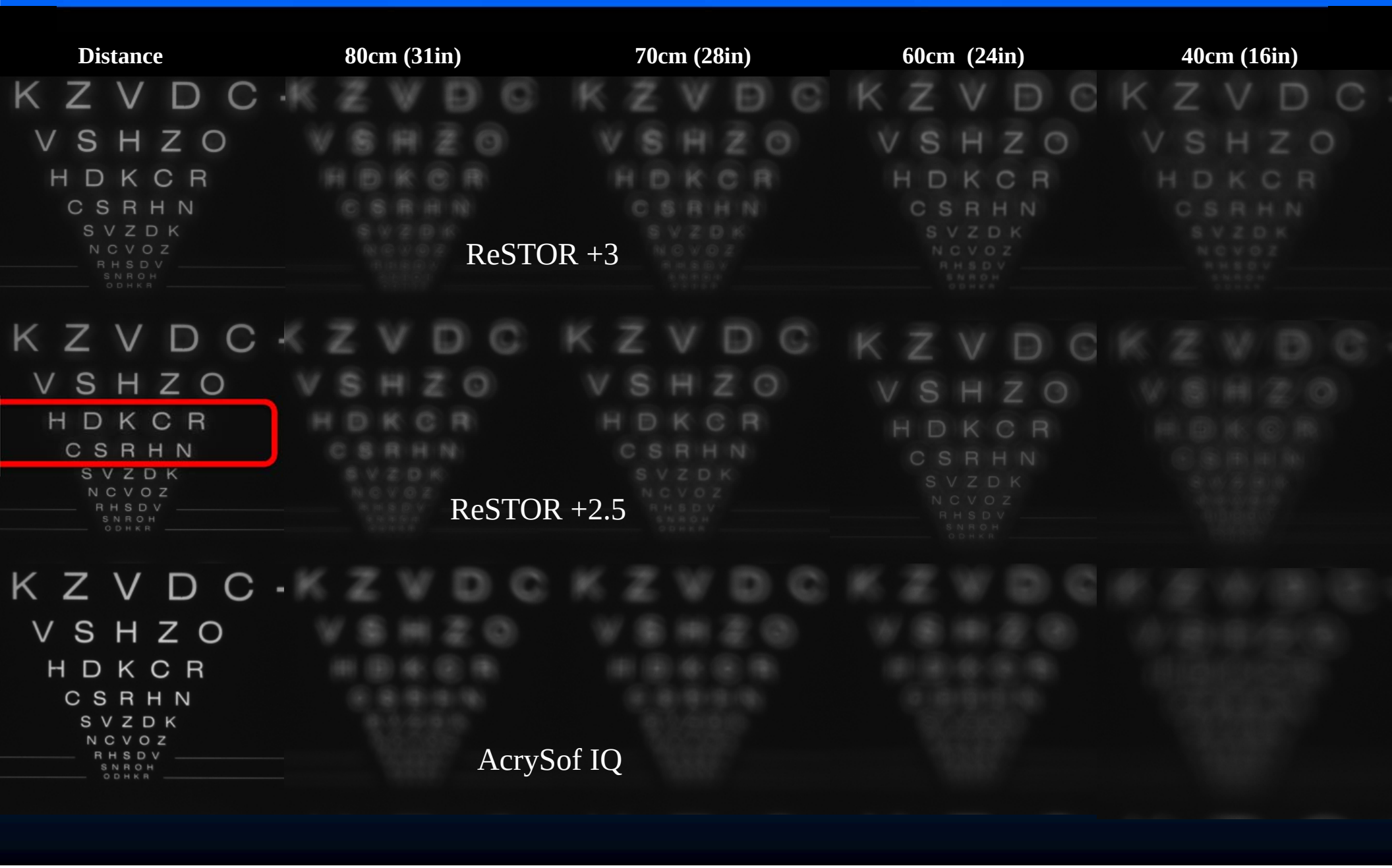
+2.5 D

+2.5	Parameter	+3.0
SV25T0	Model number	**SN6AD1**
+2.5 D	ADD (IOL plane)	**+3.0 D**
+2.0 D	ADD (Spectacle Plane)	**+2.5 D**
0.94 mm	Central diameter	**0.86 mm**
7	# steps	**9**
8.4 mm^2	Diffractive Area	**10.2 mm^2**
Dist: 69% Near: 18%	Energy distribution (3 mm IOL plane)	**Dist: 59% Near: 26%**
-0.2	Asphericity	**-0.1**

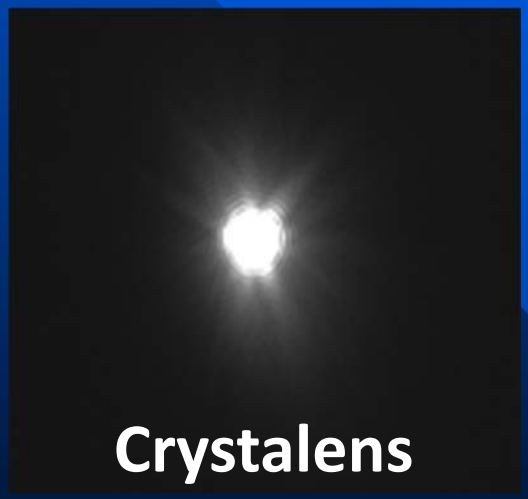
+3.0 D

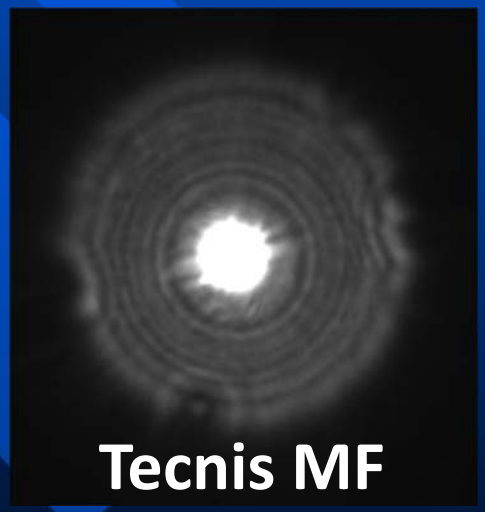


Simulated Retinal Images using a Badal Optometer (3 mm Pupil)



Simulated Headlight Images in Alcon Model Eye (5 mm Pupil Measured on the Optikos MTF System)





Visual Disturbances

Visual Disturbances 6 Months Postoperative Following Second Eye Implantation‡,1		
Visual disturbance	AcrySof® IQ ReSTOR® +2.5 Model SV25T0 (n=153)	AcrySof® IQ Monofocal Model SN60WF (n=160)
Glare/Flare		
None/Mild	75.8%	83.2%
Moderate	20.9%	13.1%
Severe	3.3%	3.8%
Halos		
None/Mild	67.4%	88.8%
Moderate	22.2%	7.5%
Severe	10.5%	3.8%

Patients implanted with AcrySof ReSTOR +2.5 experienced 3.3% severe glare

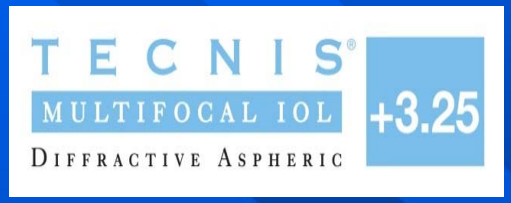
Patients implanted with AcrySof IQ Monofocal IOLs experienced 3.8% severe glare

TECNIS Multifocal Family of IOLs

A full range of outstanding vision; personalized to each patient's lifestyle

Target patient …
favors near vision activities
(reading, knitting)

NEW



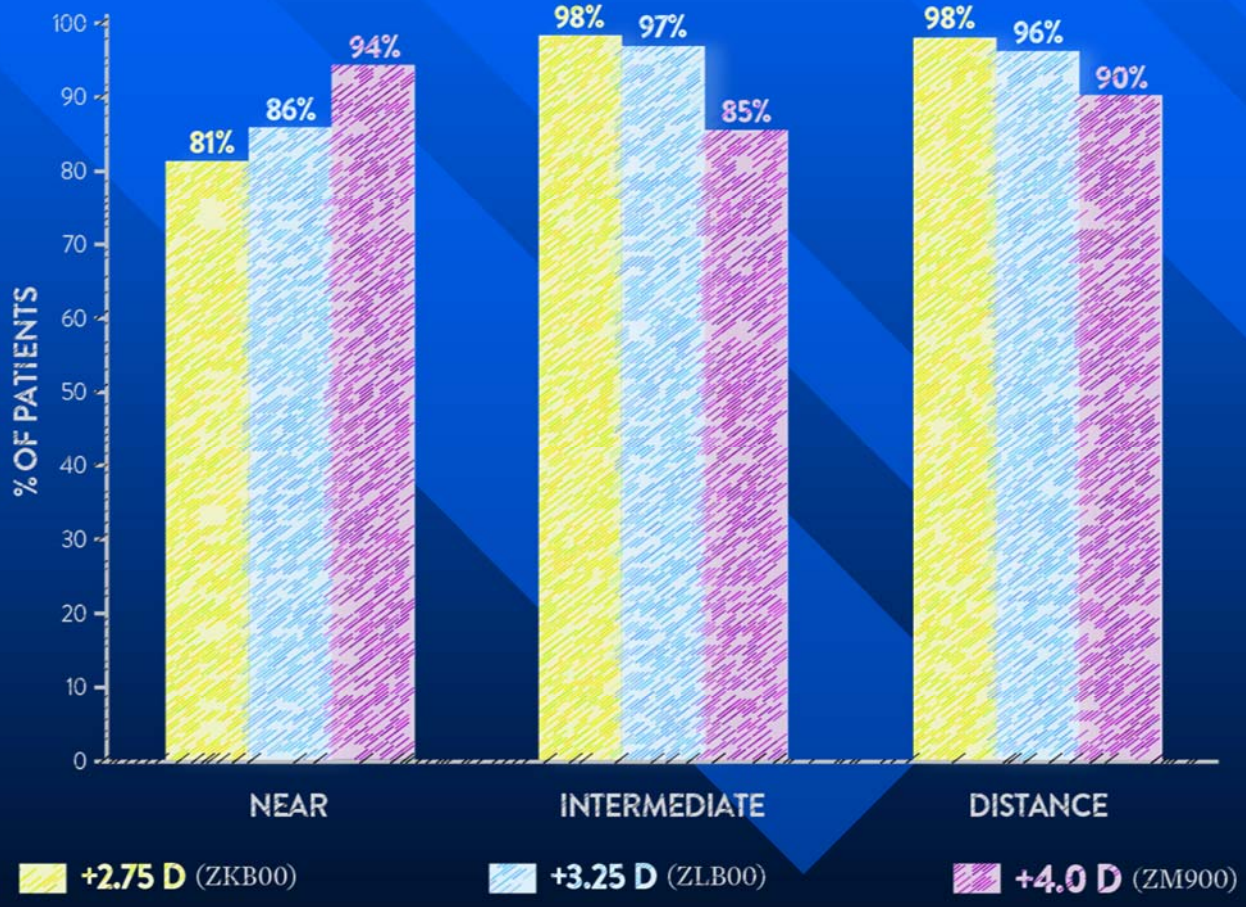
Target patient …
favors longer reading distance
(multi-media work)

NEW

Target patient …
favors intermediate vision
(golfing, grocery shopping)

TMF Clinical Outcomes

Ability to Function Comfortably Without Glasses at 6 Months (Bilateral Subjects)



TMF Clinical Outcomes

Spectacle Independence

- Functioning without glasses at all distance
  - +2.75 = 80%
  - +3.25 = 85%
  - +4.0 = 85%
- Functioning without glasses at intermediate and far distances
  - +2.75 = 98%
  - +3.25 = 96%

Patient Satisfaction

- Would elect to have the same IOL again
  - +2.75 = 97%
  - +3.25 = 94%
  - +4.0 = 87%

Visual Outcomes

- Uncorrected near vision J1 or better
  - +2.75 = 75%
  - +3.25 = 82%
- Uncorrected near vision J3 or better
  - +2.75 = 95%
  - +3.25 = 99%

Clinical Outcomes: TMF +2.75

Pt #1

20/70 20/27 J2 OD

20/30 20/27 J1 OS

20/25 20/20 J1 OU

Pt #2

20/20 20/20 J1 OD

20/20 20/20 J1 OD

20/20 20/17 J1 OU

Pt #3

20/25 20/33 J1 OD

11/10/2015 OS

Pt #4

11/10/2015 OD

20/20 20/20 J1 OS

All +2.75 in 1st dom eye, then chose same lens for 2nd non-dominant eye

Clinical Outcomes: ReSTOR +2.5

Pt #1

20/30 20/33 J2 OD

11/11/2015 OS

Pt #2

20/25 J1 OD

20/30 J2 OS

20/20 J1 OU

Pt #3

20/30 20/33 J2 OD

20/25 20/27 J2 OS

20/20 20/27 J1 OU

Pt #4

11/16/2015 OD

20/20 20/27 J1 OS

Pt #5

20/20 20/67 J5 OD

20/25 20/53 J3 OS

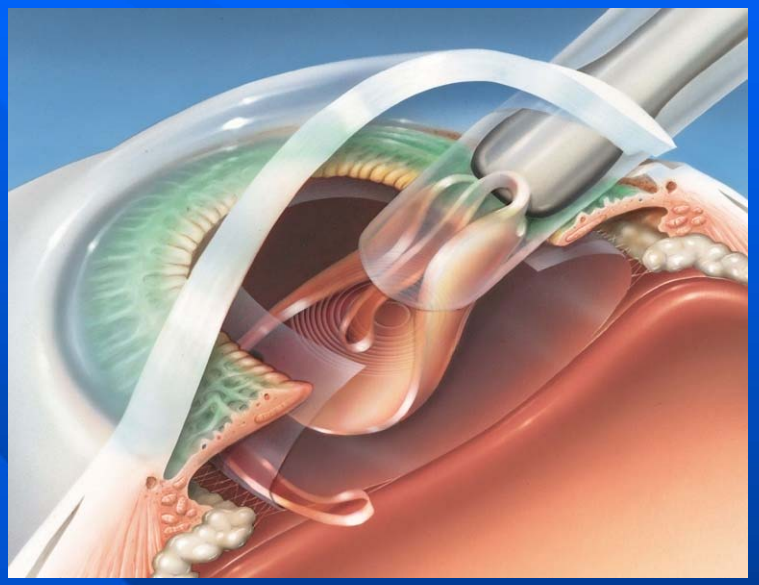
20/20 20/33 J2 OU

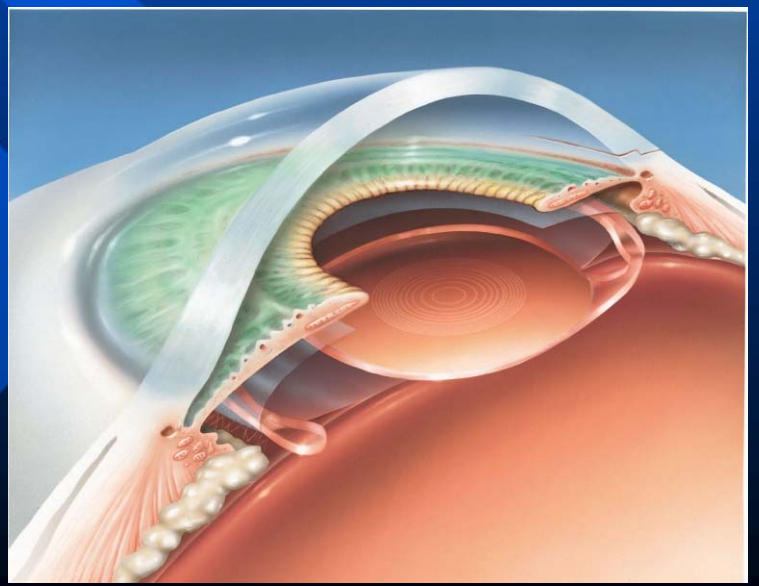
Clinical Outcomes: Toric

20/20 J16 20/40 J16 20/30+ OU	20/20 J5 11/18/2015 OS	20/30 J5 20/30 J2 20/25 20/25 J1 OU
20/30 J3 20/30 J3 20/25 20/43 J3 OU	20/20 J2 20/20 J5 20/20 J2 OU	20/25 J2 20/20 J5
20/30 J7 20/25 20/400 20/20 OU	20/20 J3 20/20 J3	20/25 J3 20/20 J3
20/20 20/30 20/20 OU	20/20 J3 20/25 J3 20/20 J3 OU	20/20 J2 20/20 J5

Summary
Goals of Modern Cataract Surgery

- Remove the clouded lens
- No longer merely to improve distance vision …
- Improve ADLs
  - Improve range of vision
  - Reduce dependence on postoperative glasses
  - Aspheric IOL design





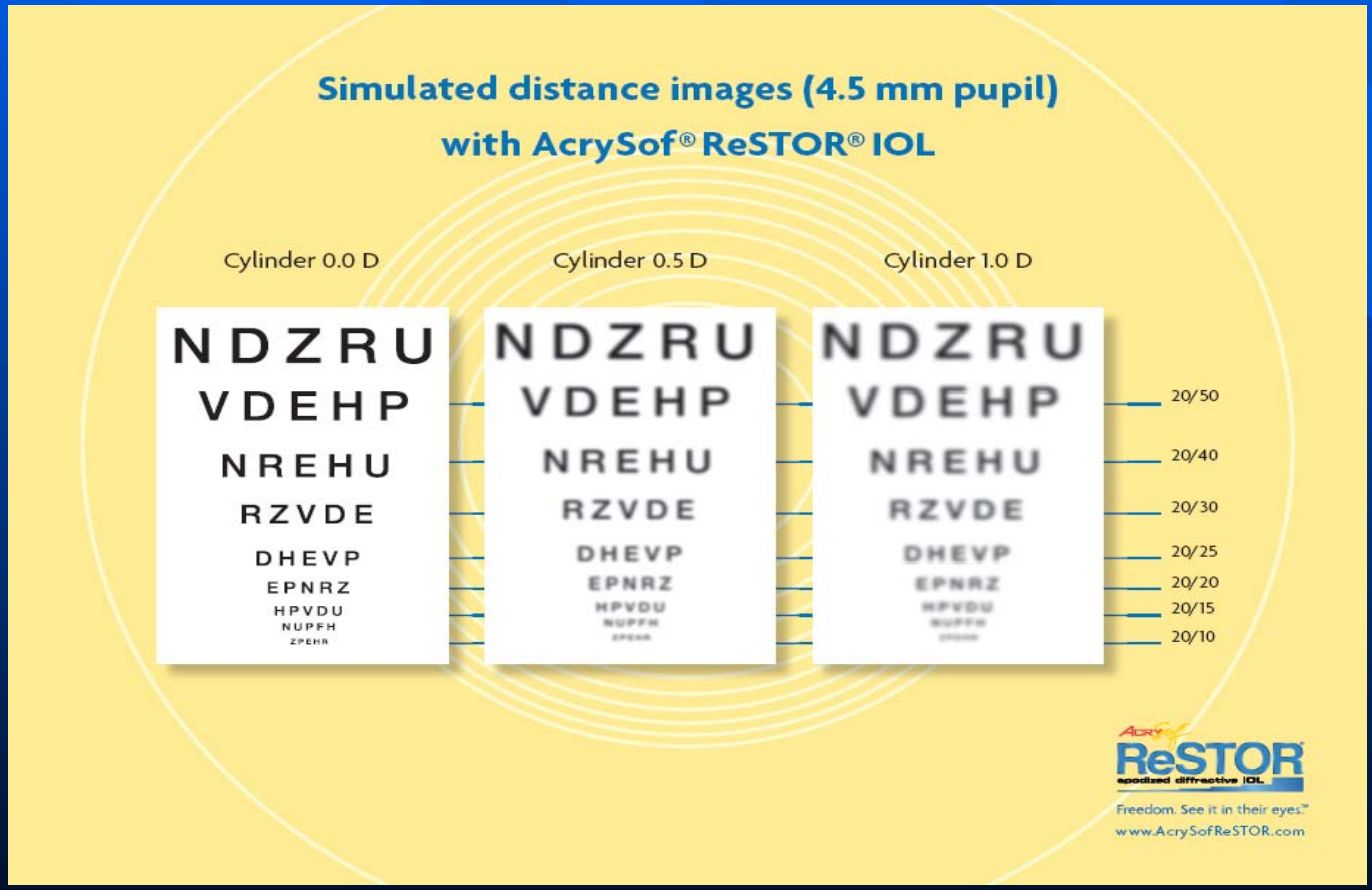
Summary
Computer Use in 50+ Age Group

- US population 50+ estimated at 106 million
- 43% of individuals 50+ use the internet 11-30 hours/week
  - Equivalent to 1.5 - 4.5 hours/day

Sources: Jupiter Communications. 2012 U.S. Census Bureau.

Summary
Patients Best Served by Presbyopic IOL

- Desire reduced spectacle dependence
- Be able to achieve <0.5 D of astigmatism post-op



Summary
Patients Best Served by Presbyopic IOL

- Desire reduced spectacle dependence
- Be able to achieve <0.5 D of astigmatism post-op
- Fit within the available IOL diopter range
- Have no contraindicated ocular pathology

- Aspheric technology now for all presbyopic lenses
  - Crystalens AO = 0
  - ReSTOR +2.5 now -0.2
  - All TMF remain -0.27

- Outstanding outcomes with current aspheric toric lenses

Summary
Patients Best Served by Presbyopic IOL

- Consider matching multifocal IOL power for each patient

  TMF +2.75 focal length 22-24 inches

  TMF +3.25 focal length 18 inches

  TMF +4.0 focal length 14 inches

  ReSTOR +2.5 focal length 21 inches

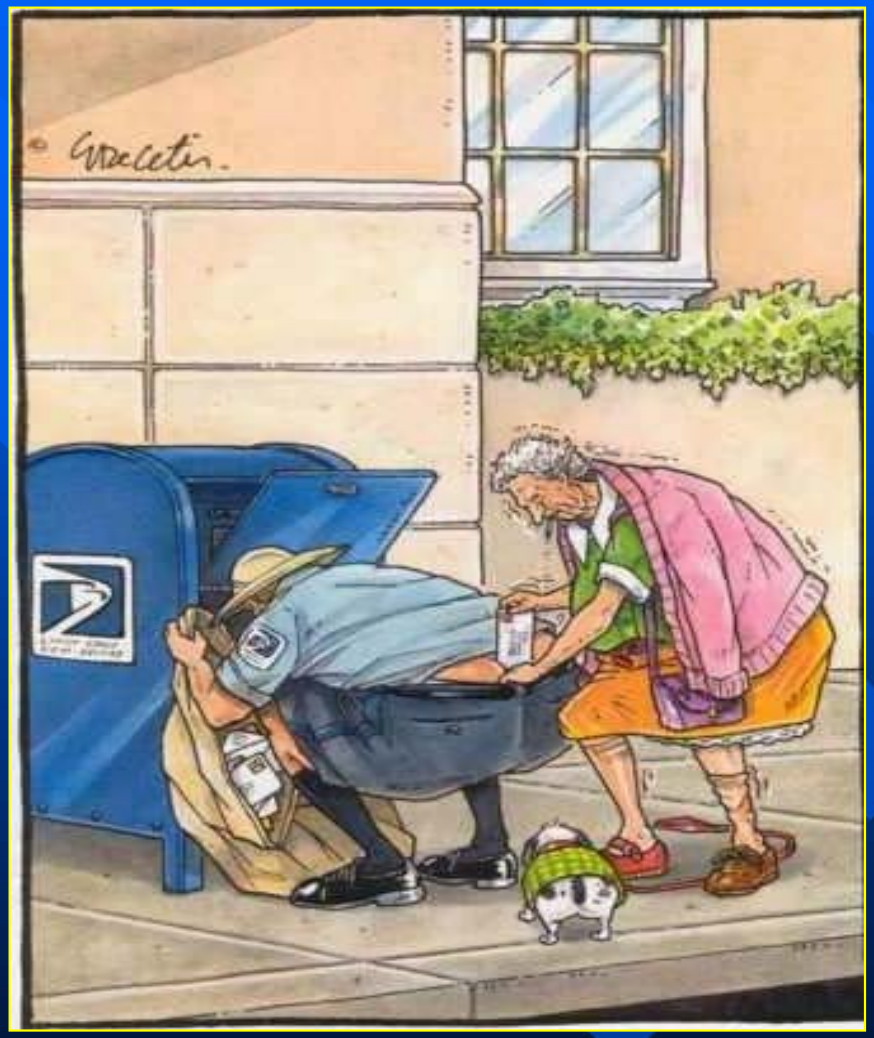
  ReSTOR +3 focal length 16 inches

- Cincinnati TMF +2.75 power for both eyes
- Dayton TMF +3.25 power for both eyes

Summary
Patients Best Served by Presbyopic IOL

- Columbus surgeons often mix their MF powers
  - 1st eye: dominant, low power MF
  - 2nd eye: non-dominant, low vs full power MF

Do Not Underestimate the Importance of Good Near and Intermediate Vision



Thank You !!!