Correction of Pseudophakic Presbyopia with Multifocal IOLs

GEORGE H.H. BEIKO, B.M., B.Ch., FRCSC
ST. CATHARINES, CANADA
ASSIST PROF. MCMASTER UNIV
george.beiko@sympatico.ca

Multifocal Lenses

Basic Designs
- Diffractive-only bifocal
- Refractive- bifocal and multifocal

Diffractive Optics

Huygens-Fresnel Principal
The bending of light around steps or corners
Light waves bend at grooves in lens
Bent light undergoes constructive or destructive interference to form two foci, near and distance
Diffractive Optics

Huygens-Fresnel Principal
The bending of light around steps or corners

Bent light undergoes constructive or destructive interference to form two foci, near and distance

Diffraction

Single slit: diffraction

Double slit: diffraction and interference

Diffractive Bifocal Design

Multiple, Sharp Interruptions of Light Surface Cause Light Diffraction

Light waves bend at grooves in lens
Diffractive Bifocal Design

Light waves bend at grooves in lens

Refractive Bifocal Lens

A refractive bifocal IOL has concentric rings which produce distance and near foci

Optical Principles of IOLs

Terwee, ESCRS 2004
Optical Principles of IOLs

Terwee, ESCRS 2004

Refractive Multifocal Lenses - AMO Array

The center of each zone is powered for distance or near vision. The aspheric transition between zones provides intermediate vision.

The AMO® Array®
Foldable Silicone Multifocal IOL Model SA40NTM

5 concentric zones

Zone 1
Zone 2
Zone 3
Zone 4
Zone 5

2.1 mm
2.1 to 3.4 mm
3.4 to 3.9 mm
3.9 to 4.6 mm
4.6 to 4.7 mm

The aspheric transition between zones provides intermediate vision.
Theoretical Energy Balance
Zonal Refractive Optic

Distance
Near
Mean Decimals Snellen VA

AMO Array- Distance Vision
Similar to Monofocal IOL

Steinert et al., 1999
Arens et al., 1999
Vaquero-Ruano et al., 1998

AMO Array- Near Vision
Superior to Monofocal IOL

Steinert et al., 1999
Arens et al., 1999
Vaquero-Ruano et al., 1998

AMO Array- Decreased
Need for Spectacles

Significantly more multifocal than monofocal IOL patients never wore glasses (P<.001)*


AMO® Array® - 75% pts with bilateral Array had UCDVA 20/40 or better and UCNVA J3 or better

Comparative Nighttime Images
(5 mm Aperture, IOL in Wet Cell)

Monofocal
AMO Array
**Comparative Nighttime Images**

- Monofocal
- AMO Array

**Refractive Multifocal Lenses - AMO ReZoom**

**AMO ReZoom™ Specifications**

- Hydrophobic acrylic material
- Three-piece design
- PMMA capsule fit haptics
- 6.0 mm optic, 13 mm OL
- +6.00 to +30.00
- 3.5 dioptres of reading power
- Features Balanced View Optics
- OptiEdge™ triple edge PC IOL design

**ReZoom™ Zones**

- Zone 1, 3, and 5 are distance vision dominant
- Zones 2 and 4 are near vision dominant
- Provides good near, intermediate and distance vision

**ReZoom™ Zones vs. Array™ Zones**

- Under low light or large pupil conditions, the amount of light that goes to the near foci is reduced and redistributed to distance; thus reducing the out of focus light on the retina
- Less out of focus light on the retina leads to less halos and glare

**AMO ReZoom™**

- less glare and halo compared to AMO Array

Rau, ASCRS 2005
**OptiEdge™ Triple Edge Design**
- Patented design minimizes PCO
- Lowest reported incidence of visual aberrations compared with those associated with double-square edge barrier designs

**ReZoom™ Canadian Multicentre Trial**
16 surgeons across Canada
- R. Baldassare MD, FRCS(C)
- R. Braga-Mele MD, FRCS(C)
- L. Brierley MD, FRCS(C)
- L. Corriveau MD, FRCS(C)
- S. Fanous MD, FRCS(C)
- F. Law MD, FRCS(C)
- M. Laflamme MD, FRCS(C)
- S. Lahoud MD, FRCS(C)
- M. Pop, MD, FRCS(C)
- T. Rabinovitch MD, FRCS(C)

**ReZoom™ Multicentre Trial - Evaluation Parameters**
- Goal to enroll 100-150 patients to be bilaterally implanted with the ReZoom Multifocal IOL
- Method:
  - Pre and post-op patient qualitative questionnaires on freedom from glasses at different distances
  - Pre and post-op patient questionnaire to evaluate Halos and Glare before and after surgery, and potential neuro adaptation between 6 week and 6 month follow-up visits
  - Pre and post-op surgeon qualitative and quantitative questionnaires on refraction and uncorrected visual acuity for Far, Near, and Intermediate distance

**Patient Selection Criteria**
- Cataract
- Hyperopic
- Presbyopic
- Astigmatism that can be corrected
- High myopes (surgeon preference)

**Patient Exclusion Criteria**
- Significant dry eye
- Corneal scarring
- Mild to moderate myopia
- Pupil size <2.5 mm
- Monofocal implant in first eye
- Uncorrected post-op astigmatism >0.5 D
- Unstable capsular support

**Target Emmetropia**
- Post-op refraction was targeted at emmetropia to +0.50 D
- Aim for patient to be plano to slightly hyperopic to provide good distance vision for driving
Preliminary results:

- # of surgeons participating in the trial: 16
- # of patients having completed pre-op questionnaire: 159
- # of patients having completed 6 week post-op follow-up: 106
- # of patients having completed 6 month post-op follow-up: 98

Excluded Patients:

- Received non-ReZoom lens in 2nd eye: 22
- ReZoom not implanted: 7
- Lost to follow-up: 6
- Surgery cancelled: 2
- Unilateral ReZoom: 2
- No information: 13

Patient distribution by age:

- 6-WEEK FU: 106 patients
- 6-MONTH FU: 98 patients

Patient distribution by gender:

- 6-WEEK FU: 66 male, 40 female
- 6-MONTH FU: 63 male, 38 female

Pre and post-op uncorrected distance visual acuity:

- 6-WEEK FU VS PRE-OP
- 6-MONTH FU

Pre and post-op uncorrected intermediate visual acuity:

- 6-WEEK F.U. VS PRE-OP
- 6-MONTH FU
Pre and post-op uncorrected near visual acuity

Spectacle independence of patients

6-MONTH FU

6-WEEK FU VS. PRE-OP

97.1% of patients never or seldom wear glasses for distance vision

87% of patients never or seldom wear glasses for distance vision

88.6% of patients never or seldom wear glasses for intermediate vision

94.3% of patients never or seldom wear vision correction glasses

Pre-op patient responses on Importance of NOT wearing glasses

6-MONTH FU

Spectacle independence for distance vision

87% of patients never or seldom wear glasses for distance vision

6-WEEK FU VS. PRE-OP

Overall spectacle Independence with ReZoom™

57.1% of patients never or seldom wear glasses for near vision

91.0% of patients never or seldom wear vision correction glasses

87% of patients never or seldom wear glasses for intermediate vision

6-MONTH FU

6-WEEK FU VS. PRE-OP

57.1% of patients never or seldom wear glasses for near vision

87% of patients never or seldom wear glasses for intermediate vision

88.6% of patients never or seldom wear glasses for intermediate vision

94.3% of patients never or seldom wear vision correction glasses

6-MONTH FU
**Spectacle independence vs age**

<table>
<thead>
<tr>
<th>Age Group</th>
<th>All Patients Wearing Glasses</th>
<th>Patient Below</th>
<th>Patient - % per Age Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;18</td>
<td>Never</td>
<td>1</td>
<td>1.9%</td>
</tr>
<tr>
<td>19-39</td>
<td>Mostly of the Time</td>
<td>8</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>Occasionally of the Time</td>
<td>1</td>
<td>14.0%</td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>1</td>
<td>25%</td>
</tr>
<tr>
<td>40-49</td>
<td>Mostly of the Time</td>
<td>7</td>
<td>52%</td>
</tr>
<tr>
<td></td>
<td>Occasionally of the Time</td>
<td>5</td>
<td>65%</td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>5</td>
<td>50%</td>
</tr>
<tr>
<td>50-59</td>
<td>Mostly of the Time</td>
<td>5</td>
<td>65%</td>
</tr>
<tr>
<td></td>
<td>Occasionally of the Time</td>
<td>3</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>2</td>
<td>25%</td>
</tr>
<tr>
<td>60-69</td>
<td>Mostly of the Time</td>
<td>3</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>Occasionally of the Time</td>
<td>2</td>
<td>14.0%</td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>5</td>
<td>77%</td>
</tr>
<tr>
<td>&gt;70</td>
<td>Mostly of the Time</td>
<td>4</td>
<td>52%</td>
</tr>
<tr>
<td></td>
<td>Occasionally of the Time</td>
<td>3</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>5</td>
<td>77%</td>
</tr>
</tbody>
</table>

**Dysphotopsias**

86% 84% 91% 99% 100%

70% 72% 72% 72% 72%

50% 72% 72% 72% 72%

52% 74% 74% 74% 74%

**Bother from halos**

**6-WEEK FU VS. PRE-OP**

77% of patients have none to mild bother from halos

**5-MONTH FU**

82.0% of patients have none to mild bother from halos

**Improvement with Halos Since Right After Surgery**

67.0% of patients have reported improvement with halos between the 6-week and 6-month follow-ups

**Bother from glare**

**6-WEEK FU VS. PRE-OP**

82% of patients have none to mild bother from glare

**6-MONTH FU**

87.0% of patients have none to mild bother from glare

**Improvement with Glare Since Right After Surgery**

66.0% of patients have reported improvement with glare between the 6-week and 6-month follow-ups
Bother from Ghosts/Double Vision - 6 Month Follow Up

- **6-WEEK FU** vs. PRE-OP: 99% of patients have none to mild bother from ghosts/double vision.
- **6-MONTH FU**: 97.0% of patients have none to mild bother from ghosts/double vision.

6-WEEK FU VS. PRE-OP 6-MONTH FU

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Improvement with Ghosts/Double Vision Since Right After Surgery

67.0% of patients have reported improvement with ghosts/double vision between 6-week and 6-month follow-ups.

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Patient satisfaction with ReZoom™ after bilateral implantation

- **6-WEEK FU**
- **6-MONTH FU**

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Dysphotopsias

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Surgeon factors of importance in selecting a Multifocal IOL

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**Post-operative surgeon evaluation of ReZoom™ performance**

- Distance vision
- Overall evaluation
- Ease of insertion
- Image of inserted ReZoom
- Size of ReZoom
- Surgeon satisfaction with ReZoom

**Conclusions**

- Ongoing study
- ReZoom provides excellent distance & intermediate vision and satisfactory near vision
- Significant improvement in distance, intermediate and near vision at 6 months post-op
- Dysphotopic phenomena were not significant and improved by 6 months
- 90% patients were spectacle independent; 90% were satisfied at 6 months
- Younger patients more likely to be spectacle independent

**AcrySof® ReSTOR® IOL**

- Diffractive Structure
  - 3.6 mm center of optic; refractive peripheral area
  - Incorporates +4.0 add at lens plane equaling +3.2 at spectacle plane
  - Apodized diffractive optic to decrease halos
  - Step heights peripherally decreasing 1.3 – 0.4 microns, peripherally decreasing widths

**Diffractive Bifocal Lenses**

- Apodization Diffractive Optic
  - Gradual decrease in step heights creating a smooth transition of light between focal points (1.3 to 0.4 microns)
  - Responsible for reduction in photic phenomenon such as glare and halos.
  - Unique to AcrySof® ReSTOR® IOL
Apodization is routinely used in microscopy and astronomy to reduce diffractive halos and improve resolution.

AcrySof® ReSTOR® IOL
Utilizes diffractive and refractive optics with apodization
- Allocating appropriate light energy according to an activity and light levels
- Minimizing photic issues through specialized optic design
- Separation of images

Near VA of first 45 ReStor pts, (greater than 6 months) results for UCNVA

**Monocular Results**
- 20/16 or better: 9%
- 20/20 or better: 44%
- 20/25 or better: 84%
- 20/30 or better: 99%

**Binocular Results**
- 20/16 or better: 20%
- 20/20 or better: 82%
- 20/25 or better: 96%
- 20/30 or better: 100%

Dick Mackool

Visual Disturbances - Pilot Study Results

- With best spectacle correction for distance, reading binocularly, 99% were 20/20 or better and 100% were 20/25 or better

Dick Mackool
Visual Disturbances – Pilot Study Results

- Intermediate VA improves significantly at one year time in ReStor patients (Robert Kaufer)

AcrySof® ReSTOR® IOL
- Intermediate VA improves significantly at one year time in ReStor patients (Robert Kaufer)

AMO Tecnis Multifocal Lens
- Diffractive posterior surface
- Modified prolate anterior surface
- +4.0D near addition: Effective add of 3.0 D
- Light distribution 50/50
- 5D to 34D in 0.5D increments

Comparison of 2 Diffractive IOLs

AcrySof® ReSTOR® SA60D3 IOL
- Refractive/diffractive
- Acrylic
- Spheric
- Anterior surface

Tecnis MF IOL
- Diffractive
- High refractive index silicon
- Aspheric
- Posterior surface

Theoretical Energy Balance

- 32 concentric zones
- Equal near/far split in effective light distribution
- Pupil size independent — far and near functionality in all light conditions
- +4 D near add (IOL plane); +3.00 add (spectacle plane)
**Study Design**

prospective, randomized study

60 patients = 120 eyes

Group 1: Array SA 40 N

Group 2: Tecnis ZM 001

Group 3: Acrysof Restor

**Inclusion Criteria**

- age > 50 years
- cataract OU
- Otherwise healthy eyes
- Keratometric astigmatism < 1.0 diopter

**Reading Acuity**

- Snellen / 40 cm
- LogMAR Score
- 100 cd/m²
- 6 cd/m²

**Uncorrected Distance Vision**

Both Eyes

- day 1-2
- day 30-60
- day 120-180

- ZM 900
- Array

**Uncorrected Near Vision**

(At 40 cm, Both Eyes)

- pre-op
- day 30-60
- day 120-180

- ZM 900
- Array

- LogMAR Score
- no correction
- best far correction
- best near correction

**Tecnis MF IOL**

MONOCULAR NEAR

Uncorrected 96% Jaeger 1

UCVA NEAR
DCVA NEAR

F COLS

Mester et al (JCRS)

- LogMAR Score
- no correction
- best far correction
- best near correction

**Uncorrected Near Vision**

(At 40 cm, Both Eyes)

- LogMAR Score
- no correction
- best far correction
- best near correction

**Reading Acuity**

- Snellen / 40 cm
- LogMAR Score
- 100 cd/m²
- 6 cd/m²

- no correction
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**Tecnis MF IOL**

MONOCULAR NEAR

Uncorrected 96% Jaeger 1

UCVA NEAR
DCVA NEAR

F COLS

Mester et al (JCRS)
Multifocal Optics

- Spectacle independence can be achieved
  - Reasonable expectations
  - Halos
- Improvements continue for 12+ months
- Diffractive & refractive both work well
  - Differences reside in the details
  - Customize for the individual patient

Mix & Match Technologies

**RESTOR N Dominant**

- 58 patients (M&M implant)
- Mean age: 55 years old
- Mean follow-up: 2 months
- Average Binocular NVA: J 1.50 (39 cm)
- Average Binocular IVA: J 2.30
- Average Binocular DVA: 20/20
- Average Binocular reading speed (wpm*): 160 with 3.5 mm pupil
- Halos/Glare: (1+)
- MTF at 100 c/mm: 0.18

**REZOOM Dominant**

- 58 patients (M&M implant)
- Mean age: 55 years old
- Mean follow-up: 2 months
- Average Binocular NVA: J 1.50 (39 cm)
- Average Binocular IVA: J 2.30
- Average Binocular DVA: 20/20
- Average Binocular reading speed (wpm*): 160 with 3.5 mm pupil
- Halos/Glare: (1+)
- MTF at 100 c/mm: 0.18

Average spectacle independence: 100%

Why Mix & Match?

Get the maximum strength from refractive and diffractive technologies and get a binocular vision with:

- Excellent Near Vision + reading speed
- Excellent Intermediate Vision
- Excellent Distance Vision
- Greater spectacle independence…
- Fulfilling all Lifestyle expectations

**BILATERAL REZOOM**

- 100 patients (binocular implant)
- Mean follow-up: 4 months
- Average NVA: J 1.40 (30cm)
- Average IVA: J 3.85
- Average DVA: 20/25
- Average reading speed (wpm*): 165 with 3.5 mm pupil
- Average spectacle independence: 88%
- Halos/Glare: (1+)
- MTF at 100 c/mm: 0.12**

Mix & Match Technologies

**BILATERAL RESTOR**

- 100 patients (binocular implant)
- Mean follow-up: 4 months
- Average NVA: J 2.30 (38 cm)
- Average IVA: J 2.15
- Average DVA: 20/20
- Average reading speed (wpm*): 125 with 3.5 mm pupil
- Average spectacle independence: 75%
- Halos/Glare: (2+)
- MTF at 100 c/mm: 0.20

Why Mix?

Get the maximum strength from refractive and diffractive technologies

**Strengths**

- Excellent Intermediate Vision
- 100% Transmission of light
- Excellent Distance Vision

**Weaknesses**

- Good Near Vision
- Lower reading speed
- Pupil dependent

**Refractive**

**Weaknesses**

- Good Near Vision
- Lower reading speed
- Pupil dependent

**Diffractive**

**Strengths**

- Excellent Near Vision
- Good reading speed
- Pupil independent

**Weaknesses**

- Lack of Intermediate Vision
- Loss of transmitted light
- Loss of contrast sensitivity

Akaishi & Fabri, Feb 2006
15 patients (M&M implant w/lifestyle dominance)
Mean age: 59 years old
Mean follow-up: 1 month

Average Binocular NVA: J 1.10 (42 cm)
Average IVA: J 2.10
Average DVA: 20/20
Average reading speed (wpm*): 185 with 3.5 mm pupil
Halos/Glare: (1-)
MTF at 100 c/mm: 0.38**

15 patients (M&M implant w/lifestyle dominance)
Mean age: 59 years old
Mean follow-up: 1 month

First Impressions:
• Less halos and glare than ReSTOR + ReZoom
• Less light needed to bilateral near vision
• More comfortable reading distance
• More bilateral contrast sensitivity
• Less spherical aberration (Tecnis MF eye)

Average spectacle independence: 100%

Akaishi & Fabri (2006)

<table>
<thead>
<tr>
<th>Near vision</th>
<th>1.4 (30 cm)</th>
<th>2.3 (38 cm)</th>
<th>1.5 (39 cm)</th>
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<tbody>
<tr>
<td>Intermed. v.</td>
<td>J 3.85</td>
<td>J 2.15</td>
<td>J 2.3</td>
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<tr>
<td>Reading speed</td>
<td>155</td>
<td>125</td>
<td>155</td>
</tr>
<tr>
<td>No glasses</td>
<td>95%</td>
<td>75%</td>
<td>100%</td>
</tr>
<tr>
<td>Halos</td>
<td>1+</td>
<td>2+</td>
<td>1+</td>
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Akaishi & Fabri (2006)

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</tr>
<tr>
<td>No glasses</td>
<td>95%</td>
<td>75%</td>
<td>100%</td>
</tr>
<tr>
<td>Halos</td>
<td>1+</td>
<td>2+</td>
<td>1+</td>
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</tr>
<tr>
<td>No glasses</td>
<td>95%</td>
<td>75%</td>
<td>100%</td>
</tr>
<tr>
<td>Halos</td>
<td>1+</td>
<td>2+</td>
<td>1+</td>
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</table>
MILNE 2006

<table>
<thead>
<tr>
<th>Far vision</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Vision 20/20</td>
<td>25%</td>
<td>94%</td>
</tr>
<tr>
<td>Vision 20/40</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td>Vision 20/800</td>
<td>88%</td>
<td>0%</td>
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</table>

<table>
<thead>
<tr>
<th>Near vision</th>
<th>%</th>
<th>%</th>
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<tbody>
<tr>
<td>Distance</td>
<td>96%</td>
<td>96%</td>
</tr>
<tr>
<td>Medium</td>
<td>83%</td>
<td>75%</td>
</tr>
<tr>
<td>Near</td>
<td>17%</td>
<td>26%</td>
</tr>
<tr>
<td>Independence of glasses</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Studies have shown that the MF IOL’s provide distance, intermediate and near vision; but what is the quality of this vision?

Presbyopia and Cataract Surgery

Refraacting/Diffracting Lenses
- glare and halos are common complaints
- loss of contrast sensitivity

Photic Phenomena-ReSTOR

ReSTOR vs Acrysof SA60AT
- 6 month comparison
- BCVA 0.9 or better in 94% ReSTOR and 96% monofocal
- 92% ReSTOR were spectacle independent
- Halos (22% vs 15%) and glare (28% vs 12%) higher in ReSTOR
- PCO rate higher (32% vs 18%) in ReSTOR

AMO Array
- decreased contrast sensitivity, compared to monofocal, of 35-40%, which improves to 20-25% with neuroadaptation
  Holladay
AMO Array

- Decreased contrast sensitivity, compared to monofocal, of 35-40%, which improves to 20-25% with neuroadaptation.

ReSTOR - Decreased Contrast Sensitivity

<table>
<thead>
<tr>
<th>Outdoor Condition</th>
<th>Target</th>
<th>Restor</th>
<th>AMD</th>
<th>City</th>
<th>AMD</th>
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<tbody>
<tr>
<td>Normal Test</td>
<td>12</td>
<td>7.5%</td>
<td>22</td>
<td>10.5%</td>
<td></td>
</tr>
<tr>
<td>Fog Test</td>
<td>12</td>
<td>11.4%</td>
<td>24</td>
<td>13.5%</td>
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<tr>
<td>Glare Test</td>
<td>12</td>
<td>11.4%</td>
<td>24</td>
<td>13.5%</td>
<td></td>
</tr>
<tr>
<td>Wearing</td>
<td>12</td>
<td>7.5%</td>
<td>22</td>
<td>10.5%</td>
<td></td>
</tr>
</tbody>
</table>

ReSTOR vs Acrysof SA60AT

- 6 month comparison
- BCVA 0.9 or better in 94% ReSTOR and 96% monofocal
- 99% ReSTOR were spectacle independent
- Halos (22% vs 15%) and glare (28% vs 12%) higher in ReSTOR
- PCO rate higher (32% vs 18%) in ReSTOR
- Static photopic measurements same in both groups; dynamic photopic measurements sig. less (p <0.05) in ReSTOR

Contrast Sensitivity Declines with Age

Spherical Aberration - Visual Effects

Contrast Sensitivity Function with 4 mm Pupil

Photopic Contrast Sensitivity


Bellucci et al., 2002

Nio, Jansonius, Fidler, Geraghty, Norrby, Kooijman
Mesopic Contrast Sensitivity

Other Studies Comparing Tecnis and Acrysof

Packer, 2002
Meester, 2003; Packer, 2003; Kershner, 2003
Bellucci, 2004; Ricci, 2004; Kennis, 2004; Piers et al, 2004
Bellucci, 2005; Casprini, 2005; Martinez, Palmer 2005

Photopic Contrast Sensitivity

Stereo Optical VT1600X

Photopic Contrast Sensitivity

Photopic Contrast Sensitivity
Contrast Sensitivity

Mesopic Contrast Sensitivity

Sa 0.37/Tecnis
Tecnis nonsel
P< 0.05
P< 0.10

ReZoom

Contrast Sensitivity

Mesopic Contrast Sensitivity

ReZoom

Tecnis

Contrast Sensitivity

Rezoom
Mesopic Contrast Sensitivity

Photopic Contrast Sensitivity

Contrast Sensitivity

Contrast Sensitivity
Conclusions

- Multifocal IOL's can provide excellent distance & intermediate vision and near vision
- Significant improvement in distance, intermediate and near vision with time post-op
- Dysphotopic phenomena are minimal with newer lenses and strategies, and improved by 6 months
- Selected patients are satisfied
- Younger patients more likely to be spectacle independent

Contraindications to IOLs

Warnings
Physicians considering lens implantation under any of the following circumstances should weigh the potential risks/benefits:

1. Recurrent severe anterior or posterior segment inflammation or ulcers.
2. Patients in whom the intracapsular lens may affect the ability to observe, elongate, or treat posterior segment disease.
3. Surgical difficulties at the time of cataract extraction that might increase the potential for complications (e.g., persistent bleeding, significant iris damage, uncontrolled positive pressure, or significant vitreous prolapse or loss).
4. A distorted eye due to previous trauma or developmental defect in which appropriate support of the IOL is not possible.
5. Circumstances that would result in damage to the anastomosis during implantation.
7. Children under the age of 2 years are not suitable candidates for intraocular lenses.
8. Patients in whom neither the posterior capsule nor zonules are intact enough to provide support.
Thank you