Adoption of advanced technology IOLs in cataract surgery

Sulcoflex Trifocal: Innovation in support of the best visual quality of patients

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Co-payment system since June 2016 ("my" leadership started on June 2015) → which percentage?

- **2017 → 8.05%**
  - ✓ Multifocal → 38.09%
  - ✓ Toric → 44.44%
  - ✓ Toric multifocal → 17.46%

- **2018: 10.03%**
  - ✓ Multifocal → 46.30%
  - ✓ Toric → 50%
  - ✓ Toric multifocal → 3.70%
Sulcoflex Trifocal IOL is indicated for the correction of pseudophakic presbyopia, thereby reducing the need for spectacles.

<table>
<thead>
<tr>
<th>Model Name:</th>
<th>Sulcoflex® Trifocal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model Number:</td>
<td>IOL703F</td>
</tr>
<tr>
<td>Power Range:</td>
<td>-3.0 D to +3.0 D (increments 0.5 D). -1.0 D to +1.0 D (increments 0.25 D) Trifocal, diffractive, +3.5 D near add and +1.75 D intermediate add at the IOL plane</td>
</tr>
</tbody>
</table>

**Aspheric Trifocal IOL**

<table>
<thead>
<tr>
<th>Material:</th>
<th>Single piece Rayacryl® hydrophilic acrylic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Content:</td>
<td>26% in equilibrium</td>
</tr>
<tr>
<td>UV Protection:</td>
<td>Benzophenone UV absorbing agent</td>
</tr>
<tr>
<td>UV Light Transmission:</td>
<td>UV 10% cut-off is 380 nm</td>
</tr>
<tr>
<td>Refractive Index:</td>
<td>1.46</td>
</tr>
<tr>
<td>Overall Diameter:</td>
<td>14.00 mm</td>
</tr>
<tr>
<td>Optic Diameter:</td>
<td>6.50 mm</td>
</tr>
<tr>
<td>Optic Shape:</td>
<td>Anterior convex, posterior concave</td>
</tr>
<tr>
<td>Asphericity:</td>
<td>Aberration-neutral technology</td>
</tr>
<tr>
<td>Haptic Angulation:</td>
<td>10° Posterior angulation</td>
</tr>
<tr>
<td>Haptic style:</td>
<td>Undulating and rounded C-loop haptics</td>
</tr>
<tr>
<td>Estimated constant for power calculation:</td>
<td>Expected lens position = 4.5 mm</td>
</tr>
</tbody>
</table>
SULCOFLEX® TRIFOCAL - RAYNER

Large, 6.5mm round-edged optic, designed to:
- Reduce the risk of pupillary block and photic effects
- Reduce risk of optic-iris capture¹
- Minimise edge glare and associated dysphotopsia¹

Optic Surface Features:
- 16 diffractive rings/steps
- 4.5 mm diffractive trifocal zone
- >4.5 mm monofocal distance zone
- Smooth anterior surface to minimise iris chafe

Rayacryl Material for:
- Good uveal Biocompatibility⁷
- Superb optical clarity - no vacuoles or glistenings⁸

Sulcoflex Trifocal has been designed to offer the following patient benefits:
- Reduces visual disturbances
- Developed to be less dependent on pupil size or lighting conditions
- Improves distance vision in mesopic conditions

Large 14.0mm overall length with undulating haptics:
- Designed for stable fixation in the ciliary sulcus
- Unique undulating round edge haptic design with 10° angulation
- Excellent centration stability compared to capsular bag fixated multifocal IOLs⁵
- Reduced risk of uveal contact and abrasion¹
- Reduced Pigment Dispersion Syndrome¹
- Smooth undulating haptics to minimise the risk of adverse tissue reaction in the sulcus
SULCOFLEX® TRIFOCAL - RAYNER

SULCOFLEX ASPHERIC

- Indicated for the correction of any residual pseudophakic ametropia
- Standard range from -5.0 D to +5.0 D
- Premium range extending from -10.0 D to +10.0 D
- Designed to be implanted in the ciliary sulcus following the primary implantation of a conventional IOL in the capsular bag
- Avoids the potential problems of conventional "piggy-back" IOLs:
  - Unique posterior concave surface, minimises the possibility of interaction with the primary IOL
  - Reduced likelihood of unwanted photopic effects
  - Reduced refractive error with hyperopic defocus
# SULCOFLEX® TRIFOCAL - RAYNER

## SULCOFLEX ASPHERIC

<table>
<thead>
<tr>
<th>Model Name:</th>
<th>Sulcoflex Aspheric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model Number:</td>
<td>653L</td>
</tr>
<tr>
<td>Power Range:</td>
<td>-10.0 to +10.0 D (0.5 D increments)</td>
</tr>
<tr>
<td>Optic Diameter:</td>
<td>6.50mm</td>
</tr>
<tr>
<td>Overall Length:</td>
<td>14.00mm</td>
</tr>
</tbody>
</table>

### Delivery System

- **Injector Type:** Sterile Single use loadable injector
- **Nozzle Size:** 2.00 mm
- **Bevel Angle:** 45°
- **Lens Delivery:** Single handed plunger

### Aspheric Monofocal IOL

- **Material:** Single piece Rayacryl® hydrophilic acrylic
- **Water Content:** 26% in equilibrium
- **UV Protection:** Benzophenone UV absorbing agent
- **UV light transmission:** UV 10% cut-off is 380 nm
- **Refractive Index:** 1.46
- **Optic Shape:** Posterior concave surface
- **Asphericity:** Anterior aspheric surface with aberration-neutral technology
- **Optic Edge Design:** Round-edged optic
- **Haptic Angulation:** 10°
- **Haptic style:** Posterior haptic angulation
SULCOFLEX® TRIFOCAL - RAYNER

SULCOFLEX ASPHERIC

- Accuracy of results
- Sulcus stability

Correction of undesirable pseudophakic refractive error with the Sulcoflex intraocular lens.
Falzon K¹, Stewart OG.

Performance of the Sulcoflex piggyback intraocular lens in pseudophakic patients.
Khan Mi¹, Muhtaseb M.

Piggyback intraocular lens implantation to correct pseudophakic refractive error after segmental multifocal intraocular lens implantation.
Venter JA, Oberholster A, Schallhorn SC, Pelouskova M.

New supplementary intraocular lens for refractive enhancement in pseudophakic patients.
Kahraman G¹, Amon M.
SULCOFLEX® TRIFOCAL - RAYNER

RAYONE TRIFOCAL

Features:
- 16 diffractive steps / rings
- 4.5 mm diffractive zone
- > 4.5 mm monofocal, distance

Benefits:
- Reduces visual disturbances
- Developed to be less dependent on pupil size or lighting conditions
- Improves distance vision in mesopic condition

aberration-neutral aspheric optic
Based on proven haptic technology for excellent stability
Amon-Apple enhanced square edge for minimal PCO
Zero glistenings
Fully preloaded across entire power range, 0.0 D to +30.0 D
# SULCOFLEX® TRIFOCAL - RAYNER

## RAYONE TRIFOCAL

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<thead>
<tr>
<th>Model Name</th>
<th>RayOne® Trifocal</th>
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<tbody>
<tr>
<td>Model Number</td>
<td>RA0603F</td>
</tr>
<tr>
<td>Power Range</td>
<td>0.0 D to +30.0 D (increments 0.5 D)</td>
</tr>
<tr>
<td></td>
<td>Trifocal, diffractive, +3.5 D near add and +1.75 D intermediate add at the IOL plane</td>
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### Delivery System

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<tr>
<th>Injector Type</th>
<th>Single use, fully preloaded IOL injection system</th>
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<tbody>
<tr>
<td>Nozzle Size</td>
<td>1.65 mm</td>
</tr>
<tr>
<td>Bevel Angle</td>
<td>45°</td>
</tr>
<tr>
<td>Lens Delivery</td>
<td>Single handed plunger</td>
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### Aspheric Monofocal IOL

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<td>6.00 mm</td>
</tr>
<tr>
<td>Optic Shape</td>
<td>Biconvex (positive powers)</td>
</tr>
<tr>
<td>Asphericity</td>
<td>Aberration-neutral technology</td>
</tr>
<tr>
<td>Optic Edge Design</td>
<td>Amon-Apple 360° enhanced square edge</td>
</tr>
<tr>
<td>Haptic Angulation</td>
<td>0°, uniplanar</td>
</tr>
<tr>
<td>Haptic Style</td>
<td>Closed loop with anti-vaulting haptic (AVH) technology</td>
</tr>
</tbody>
</table>
RAYONE TRIFOCAL – OUR RESULTS

- Evaluation of visual performance, patient satisfaction, stability and posterior capsular opacification (PCO) incidence in 6 patients underwent bilateral cataract surgery with implantation of new RayOne® (Rayner) trifocal intraocular lens

- Follow-up: 10 months

- Data evaluated:
  - UCVA and BCVA (LogMAR)
  - Near and Intermediate Visual Acuity (LogMAR) with MNread charts
  - Contrast sensitivity with MOS 22 (Dueffe Tecnovision)
  - Defocus curve from -4.00 D to +4.00 D
  - Aberrometry (OSIRIS – CSO)
  - Patient satisfaction with a self-administered questionnaire (NEI-RQL-42TM)
  - PCO incidence and IOL stability with digital photos of anterior segment
RAYONE TRIFOCAL – OUR RESULTS

- All patients achieved UDVA of 0.1 LogMAR or better
- 8 patients (66%) achieved UNVA of 0.1 LogMAR or better
- 4 patients (33%) achieved UIVA of 0.1 LogMAR or better and 11 patients (91%) achieved UIVA of 0.2 LogMAR or better
Rayone Trifocal – Our Results

Defocus curve:
- From +1.00 D to -2.00 D, visual acuity was >0.10 LogMAR in all patients, demonstrating good intermediate vision.
- At -2.50 D, corresponding to near vision at 40 cm, visual acuity was 0.12 LogMAR or better.

Contrast sensitivity:
- Contrast sensitivity levels were within normal limits both under photopic (85 cd/m²) and mesopic (3 cd/m²) conditions.
RAYONE TRIFOCAL – OUR RESULTS

Aberrometry:
- Low values of LOA and HOA regarding ocular, corneal and internal aberrations in all patients
- Internal aberrations are directly related to the IOL: low values of RSM indicate a minimum dispersion of the light inside the eye by the IOL

IOL stability and PCO incidence:
- PCO was no reported in all patients
- IOL stability and centration was excellent during the follow-up
Diffractive step Trifocal technology reduces light loss to only 11%:
- 89% of light transmitted to the retina with a pupil of 3 mm
- Light Energy Split at 3.0 mm pupil:
  ✓ 52% Distance
  ✓ 22% Intermediate
  ✓ 26% Near

Comfortable transition from near to distance activities:
- Sulcoflex® Trifocal is designed with:
  ✓ +3.50 D near add: 37.5 cm reading plane
  ✓ +1.75 D intermediate add: 75.0 cm reading plane
Designed to avoid the potential problems of conventional “piggy-back” IOLs\textsuperscript{1,6,9}

- Unique posterior concave surface minimises the possibility of interaction with the primary IOL
- Reduced likelihood of unwanted photopic effects
- Reduced refractive error with hyperopic defocus

Physical contact between the two IOLs minimised.
- Lens Design 6.50 mm Optic x 14.00 mm overall length with C-Loop 10° haptic angulation and continuous ripple for superior sulcus stability

- Optical thickness about 50% of a traditional IOL

- Front Convex optical profile bevel with neutral aberration with anti-glare edge

- Rear Optic profile concave trifocal with a diffractive diameter of 4.50 mm (16 double-profile rings diffractive and only 11% loss of brightness)
- Same diffractive profile in the Rayone trifocal lens
- Different positioning of the diffractive rings: anterior in the convex optics of Rayone trifocal, posterior in the concave optic of Sulcoflex trifocal
- The trifocal rear concave profile of Sulcoflex trifocal functions as a trait d'union between the two optics: IOL in the capsular bag and IOL in the sulcus
Defocus Curve

- Comparing the Defocus obtained from the 2 Rayner Trifocal lenses with the same design but different positioning (RayOne Trifocal vs Sulcoflex Trifocal) The perfect comparability is observed both in the distant and intermediate at 75 cm and in the near 37.5 Cm

*Data: courtesy by Prof. Amon - one month study follow-up DUET procedure
CLINICAL CASE

- Pz M 72 aa – Cataract OD
- In 2016: Phaco + IOL monofocal OS
- VOD 5/10 -3.00 sf; J 3 nat
- VOS 10/10 nat; J 3 +2.75 sf
- Wants to improve vision from afar, but keep independence from glasses (far and close)

Surgical planning:
- OD RayOne Trifocal
- OS Sulcoflex Trifocal
SULCOFLEX® TRIFOCAL - RAYNER

SULCOFLEX: FIRST IMPLANTS

**OD**

Post-op UCVA: 10/10 nat OO

Post-op UIVA: J 3 nat OO

Post-op UNVA: J 3 nat OO

High patient satisfaction

**OS**
SULCOFLEX® TRIFOCAL - RAYNER

SULCOFLEX: FIRST IMPLANTS

Monofocal IOL

After Sulcoflex implant
SULCOFLEX® TRIFOCAL - RAYNER

SULCOFLEX: FIRST IMPLANTS

UBM:
IOL design and centration
First results of Sulcoflex Trifocal implantation in a group of patients