New developments in refractive cataract surgery

Exeter Laser Eye Surgeons
Trends

• Smaller corneal incisions
• Aspheric lens implants
• Toric aspheric lens implants
• Presbyopia solutions
• Light adjustable lens
• Femtosecond laser assisted cataract surgery
Incision size

• 3.2mm to 2.2mm in last few years
• Can go as low as 1.8mm
• Advantage – better astigmatism control
  – Less wound leak
  – More rapid visual recovery
Lens implant trends

- Toric implants – can correct almost any amount of astigmatism and any refractive error – highly stable in capsular bag
- Light adjustable lens – can ‘tweek’ post-op to eliminate residual refractive error
- Presbyopia solutions – bifocal, trifocal, ‘accommodating’
- New solution – diffractive echelette design
AMO Technis Symfony lens

- Merges 2 complimentary technologies to deliver the first presbyopia-correcting extended range of vision IOL
- Released September 2014
Symfony design

• Diffractive echelette design – elongates the focus of the eye

• Achromatic design corrects chromatic aberration for enhanced contrast sensitivity
Symfony design
Chromatic aberration correction

Not corrected for chromatic aberration

Corrected for chromatic aberration
Defocus curve - 3 month data

Mean VA of 20/20 or better through 1.5 D of defocus

Mean VA of 20/40 or better through 2.5 D of defocus
Contrast sensitivity equivalent to Technis Monofocal lens implant
Symphony trial results (NZ)

- No compromise of distance vision
- 100% no distance spectacles
- 94% no intermediate vision spectacles
- 87% no reading spectacles
- No spontaneous reports of halo or glare
- No significant reduction in contrast sensitivity found in patient studies
Near & Intermed VA
Mean visual acuity at 3-month visit

<table>
<thead>
<tr>
<th>Condition</th>
<th>Mean LogMAR VA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncorrected Distance VA</td>
<td>0.048</td>
</tr>
<tr>
<td>Best Corrected Distance VA</td>
<td>-0.112</td>
</tr>
<tr>
<td>Distance Corrected Intermediate VA</td>
<td>-0.031</td>
</tr>
<tr>
<td>Distance Corrected Near VA</td>
<td>-0.126</td>
</tr>
</tbody>
</table>

- Mean TECNIS® Symphony IOL (31)
- Mean TECNIS® Monofocal IOL (10)
Rationale for use of Symfony

• Presbyopia correction with much reduced problems compared with bifocal & trifocal IOLs

• Aim for plano in 1 eye and -0.75 in the second eye to get excellent reading and distance vision
Percentage of TECNIS® Symfony IOL Patients Who Reported Never Wearing Glasses

- Close at hand: 87%
- At arm’s length: 94%
- At a distance: 100%

n=31
TECNIS® Symfony IOL Mean Visual Acuities²
(n=25 at Far, 26 at Intermediate & Near)

(Snellen Acuity) logMAR

Far | Intermediate | Near

(20/40) 0.3
(20/30) 0.2
(20/25) 0.1
(20/20) 0.0
(20/16) -0.1
(20/12.5) -0.2

(20/25) 0.1
(20/20) 0.0
(20/16) -0.1
(20/12.5) -0.2

UNCORRECTED
DISTANCE-CORRECTED
0.50 MONOVISION
0.75 MONOVISION
1.00 MONOVISION
Laser cataract surgery

• Why femtosecond laser assisted cataract surgery?
  – Precise capsular rehexesis
  – Precise corneal incisions
  – Lens is divided into small segments, allowing removal with less or no ultrasonic (phaco) energy
  – May be safer than normal techniques in some situations
  – Precision limbal relaxing incisions possible for smaller astigmatism corrections
  – ‘Blade free’
Ziemer Z8

The first truly mobile refractive cataract femtosecond laser

Now CE approved
Our experience

• We use the Ziemer femtosecond laser for LASIK

• New Ziemer Z8 laser combines laser cataract and LASIK flap capabilities

• Integrated OCT to scan anterior segment & lens to automatically derive treatment plan

• Fluid interface – low increase in IOP, no corneal folds
Ziemer Z8

- Operates in megahertz range – all others kilohertz (1000x faster)
- Very short focal length, high pulse repetition rate – little collateral tissue damage cf all other lasers – much less inflammation
- Mobile