Toric Multifocal MPlus

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Optical Express
Goal Modern Cataract Surgery

- Restore
  - visual acuity
  - emmetropia

- Gain spectacle independence
  - distance
  - near vision
  - intermediate vision

- Achieved with multifocal intraocular lenses
Incidence of corneal cylinder in 14,980 RLE/Cataract eyes

- 0.00 to 0.50 D: 37.8%
- 0.51 to 1.00 D: 29.9%
- 1.01 to 1.50 D: 14.8%
- 1.51 to 2.00 D: 7.4%
- 2.01 to 3.0 D: 6.0%
- 3.01 and more D: 4.0%
Effect Astigmatism

- Postoperative astigmatism of 1.0 D or more compromises distance/intermediate visual acuities in eyes with a multifocal IOL.

Strategies for minimizing postoperative astigmatism

- Astigmatism is routinely corrected at the time of cataract/RLE treatment using:
  - Corneal surgery\(^1\)
    - Limbal relaxing incisions
    - OCCI
  - Implanting a Toric intraocular lens (IOL)\(^2\)

Strategies for minimizing postoperative astigmatism

Correct postoperatively

- Glasses
- Laser surgery (LASIK or PRK)
- FS Astigmatic Keratotomy
- Toric Piggyback IOL
Study Group

• Retrospective Toric Multifocal Intra-ocular Lens Implantation Study Evaluating Clinical, and Quality-of-life Outcomes

Exclusion Criteria

• Lifestyle or profession with high distance visual demands and high contrast needs (pilots, air controllers, photographers)
• Cornea not suitable for laser adjustments
• Amblyopia/ Strabisme
• Post LVC
• Significant ocular disease
Study Group

- Number of eyes **1030**

- Preop refractive Sphere:
  - +3.12D +/- 5.18 SD (from -11.0 to +12.25 D)

- Preop refractive Cylinder:
  - -3.81 +/- 1.43 (from -1.50 to -6.75 D)

- Spherical power of implanted IOL:
  - 23.68 D +/- 6.78 (from 1.9D to 34.45D)

- Cylindrical power of implanted IOL:
  - 3.78 +/- 1.6 (from 1.50 to 8.04D)
Efficacy
(preop BCVA vs postop UCVA)

- Preoperative BCVA
- 3 months postoperative UCVA

<table>
<thead>
<tr>
<th></th>
<th>6/5 or better</th>
<th>6/6 or better</th>
<th>6/7.5 or better</th>
<th>6/9 or better</th>
<th>6/12 or better</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preoperative BCVA</td>
<td>30%</td>
<td>62%</td>
<td>91%</td>
<td>98%</td>
<td>100%</td>
</tr>
<tr>
<td>3 months postoperative UCVA</td>
<td>31%</td>
<td>65%</td>
<td>89%</td>
<td>97%</td>
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Near Visual Acuity

- **Monocular UNVA**
- **Binocular UNVA**

<table>
<thead>
<tr>
<th>Acuity Level</th>
<th>Monocular UNVA</th>
<th>Binocular UNVA</th>
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</thead>
<tbody>
<tr>
<td>6/6 or better</td>
<td>12%</td>
<td>19%</td>
</tr>
<tr>
<td>6/7.5 or better</td>
<td>36%</td>
<td>50%</td>
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<tr>
<td>6/9 or better</td>
<td>59%</td>
<td>76%</td>
</tr>
<tr>
<td>6/12 or better</td>
<td>80%</td>
<td>89%</td>
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<tr>
<td>6/15 or better</td>
<td>97%</td>
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J5 or better
Magnitude of residual cylinder

- Preoperative refractive cylinder
- 3 months postoperative refractive cylinder
Doubled angle plot

Graph A:
- Each ring = -1.00 D
- Outer ring = -6.00 D

Graph B:
- Each ring = -1.00 D
- Outer ring = -6.00 D
Patient Questionnaire
filled in the clinic on 3 months follow-up appointment

“How satisfied are you with the outcome of your procedure?”

- Very satisfied: 64%
- Satisfied: 34%
- Dissatisfied: 1%
- Very Dissatisfied: 1%

N = 1000
Patient Questionnaire
filled in the clinic on 3 months follow-up appointment

“Would you recommend the Procedure?”

N = 1000
Patient Questionnaire
filled in the clinic on 3 months follow-up appointment

How has your procedure affected your ability to DRIVE at NIGHT?*

- Significantly Improved/Improved: 45%
- Not affected: 22%
- Impaired: 18%
- Sig impaired: 6%
- I do not drive: 9%

N = 1000
Patient Questionnaire
filled in the clinic on 3 months follow-up appointment

“How has your procedure affected your ability to READ SMALL PRINT such as a telephone book, newspaper or medicine bottle?”

- Significantly improved: 57%
- Improved: 29%
- Not affected: 7%
- Impaired: 6%
- Significantly impaired: 1%

N = 1000
Second Study: Analysis

- 89 eyes of 58 patients with Mplus Toric lens, thoroughly followed, dilated at 3 months to check the position of the lens.
- Questionnaire derived from P.R.O.W.L study answered at 3 months postoperatively. (Patient-Reported Outcomes with LASIK)
- Patient’s mean age 54.8 years (range from 42 to 73 years)
- 60.3% Male/ 39.7 % Female
Toric LENTIS MPLUS

Study Group

- Number of eyes **89**

- Preop refractive Sphere:
  - **+3.7D** +/- 4.74 SD (from -11.0 to +12.25 D)

- Preop refractive Cylinder:
  - **-2.9** +/-1.31 (from -1.75 to -6.0)

- Spherical power of implanted IOL:
  - **22.4 D** +/- 6.59 (from 1.9D to 33.23D)

- Cylindrical power of implanted IOL:
  - **3.66** +/- 1.2 (from 1.46 to 7.04D)
Efficacy
(preop BCVA vs postop UCVA)

- Preoperative BCVA
- 3 months postoperative UCVA

<table>
<thead>
<tr>
<th>Vision Level</th>
<th>Preop BCVA</th>
<th>Postop UCVA</th>
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<tbody>
<tr>
<td>6/5 or better</td>
<td>37%</td>
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Near Visual Acuity

- **Monocular UNVA**
- **Binocular UNVA**

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<td>74%</td>
<td>83%</td>
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<td>96%</td>
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J5 or better
Safety

- Lost 2 lines or more: 0.0%
- Lost 1 line: 14.6%
- Unchanged: 53.9%
- Gained 1 line: 24.7%
- Gained 2 lines or more: 4.5%
Magnitude of residual cylinder

Number of eyes

Magnitude of refractive cylinder (D)

- Preoperative refractive cylinder
- 3 months postoperative refractive cylinder
Doubled angle plot

Preop

Postop
Stability of Mplus Toric lens

- None of the lenses needed a secondary repositioning due to excessive rotation at 3 months postoperatively.

- The mean difference between the planned intraoperative toric IOL axis and actual axis alignment at 3 months was $2.78^\circ$.

- All patients were within $\pm 10$ degrees of the intended axis, and 91% were within $\pm 5$ degrees.
• Toric IOLs effectively improve visual acuity and quality of life in astigmatism patients compared to conventional monofocal IOLs$^{1,2,3}$