Long term visual performance with polyfocal, bioanalogic IOL: 1 year results

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Polyfocal hyperbolic optics: refractive power is maximal in the center and continuously decreases without steps to periphery.

Polyfocality = increased depth of focus

Key WIOL-CF mode of action:
Extended depth of focus (EDOF) achieved by non-diffractive optics approach (i.e. minimizing diffractive optics limitations like low contrast sensitivity, high optical phenomena rate/severity, etc.) combined with pseudo-accommodation driven by pupil constriction.
Bioanalogic design

WIOL-CF is designed according to bioanalogic principle, i.e. selective application of key functional and structural features learned from the nature used to create an artificial functional analogy (rather than an exact copy) of the organ. In case of WIOL-CF, functional analogies derived from the nature are especially polyfocality, size and material.
Bioanalogic material

WIGEL material was synthesized according to the same bioanalogic principle to resemble key features of NCL tissue. WIGEL is the only material primarily and specifically developed for use in intraocular applications.

<table>
<thead>
<tr>
<th>Natural crystalline lens material</th>
<th>WIGEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogel-like tissue</td>
<td>Proprietary hydrogel material with excellent biocompatibility</td>
</tr>
<tr>
<td>Negative charge (carboxylate and sulphate groups)</td>
<td>Negative charge (carboxylate groups)</td>
</tr>
<tr>
<td>High water content (66%)</td>
<td>High water content (42%)</td>
</tr>
<tr>
<td>Refractive index 1.42</td>
<td>Refractive index 1.43</td>
</tr>
<tr>
<td>Low reflectivity</td>
<td>Low reflectivity</td>
</tr>
<tr>
<td>Long-term stability</td>
<td>Long-term stability (20+ years of experience)</td>
</tr>
</tbody>
</table>
**Method**

**Study design:**
- Prospective
- Non randomized
- Multicenter - in the Czech Republic
- Bilateral WIOL-CF implantation
- Central data registry

**Patient data**
- 124 eyes of 62 patients (24 male, 38 female)
- Mean age 62.8 (±8.3) years, (range 47-82)
- Cataract without any other intraocular pathology
- Corneal astigmatism < 1.25 cylD
- 12 months follow up
### Uncorrected VA binocular outcome at 1 year

<table>
<thead>
<tr>
<th>Uncorrected VA binocular</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>UDVA (dec)</td>
<td>62</td>
<td>0.96</td>
<td>0.18</td>
</tr>
<tr>
<td>UIVA (logMAR)</td>
<td>62</td>
<td>0.15</td>
<td>0.12</td>
</tr>
<tr>
<td>UNVA (logMAR)</td>
<td>62</td>
<td>0.29</td>
<td>0.16</td>
</tr>
</tbody>
</table>

**Graphs:***

- **UDVA:**
  - > 1.0 dec: 68%
  - > 0.9 dec: 79%
  - > 0.8 dec: 92%

- **UIVA:**
  - < 0.0 logMAR: 16%
  - < 0.1 logMAR: 44%
  - < 0.3 logMAR: 93%

- **UNVA:**
  - < 0.1 logMAR: 16%
  - < 0.2 logMAR: 31%
  - < 0.4 logMAR: 79%
## Corrected VA and refractive outcome at 1 year

### Corrected VA binocular

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDVA (dec)</td>
<td>62</td>
<td>1.02</td>
<td>0.12</td>
</tr>
<tr>
<td>CNVA (logMAR)</td>
<td>62</td>
<td>0.12</td>
<td>0.15</td>
</tr>
</tbody>
</table>

### CDVA

- > 1.0 dec: 87%
- > 0.9 dec: 93%
- > 0.8 dec: 100%

### CNVA

- < 0.1 logMAR: 68%
- < 0.2 logMAR: 86%
- < 0.4 logMAR: 98%

### Refractive outcome

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Sphere (D) ± SD</th>
<th>Cyl (D) ± SD</th>
<th>SE (D) ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>WIOL-CF</td>
<td>124</td>
<td>0.06 ± 0.45</td>
<td>0.09 ± 0.29</td>
<td>0.05 ± 0.47</td>
</tr>
</tbody>
</table>
Results

94% of patients without disturbing optical phenomena

82% is spectacle independent

*Solicited reporting

*spectacle needs for near only

Mesopic Contrast sensitivity above healthy population norm

None
Mild (not-disturbing)
Disturbing

Need spectacle
Spectacle independent
Conclusions

The WIOL-CF intraocular lens provides

- Excellent and predictable far and intermediate visual acuity results
- Near visual acuity in the range of „social reading“ for majority of patients
- Polyfocal optics safety confirmed by BCVA results for far and near distance
- Excellent contrast sensitivity and low level of severe/disturbing glare and halo is a base for high patient satisfaction and spectacle independence rates.

WIOL-CF should be considered as very promising IOL for refractive and cataract surgery, correcting presbyopia.