Comparative Analysis of Implantation Behavior of Different Hydrophobic Intraocular Lenses with Preloaded and Conventional IOL delivery systems

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Contamac\textsuperscript{1}
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1 = Research Grants; 2 = Travel Expenses; 3 = Lecture Fees; 4 = Consulting
Purpose

• Evaluation of unfolding characteristics of preloaded hydrophobic intraocular lenses

• Statistical evaluation of implantation behavior

• Check for complications during implantation

• Visualize injector cartridge damages
Methods

Prospective interventional case study
88 implantations of different hydrophobic lenses

<table>
<thead>
<tr>
<th>AcrySof® SN60WF (Alcon)</th>
<th>CT LUCIA® 601P (ZEISS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tecnis® PCB00 (AMO)</td>
<td>iSert® 254 (HOYA)</td>
</tr>
</tbody>
</table>
# IOL data overview

<table>
<thead>
<tr>
<th>Model</th>
<th>AcrySof SN60WF</th>
<th>CT LUCIA 601P</th>
<th>Tecnis PCB00</th>
<th>Vivinex XY1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optic Design</td>
<td>Biconvex, Aspheric</td>
<td>Monofocal, aspheric</td>
<td>Biconvex, anterior aspheric surface</td>
<td>Aspheric ABC Design with sharp textured optic edge</td>
</tr>
<tr>
<td>Optic Material</td>
<td>Acrylate/Methacrylate Copolymer</td>
<td>Hydrophobic acrylic with heparin coated surface</td>
<td>UV-blocking hydrophobic acrylic</td>
<td>Hydrophobic acrylic Vivinex™ Materials with blue light filtering</td>
</tr>
<tr>
<td>Optic Diameter</td>
<td>6.0 mm</td>
<td>6.0 mm</td>
<td>6.0 mm</td>
<td>6.0 mm</td>
</tr>
<tr>
<td>Overall Length</td>
<td>13.0 mm</td>
<td>13.0 mm</td>
<td>13.0 mm</td>
<td>13.0 mm</td>
</tr>
<tr>
<td>Haptic Angulation</td>
<td>0°</td>
<td>5°</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Haptic Configuration</td>
<td>STABLEFORCE® Haptics</td>
<td>C-Loop</td>
<td>Tri-Fix offset haptics</td>
<td>textured-rough haptic surface</td>
</tr>
<tr>
<td>Suggested A-Constant</td>
<td>118.7</td>
<td>118.5</td>
<td>118.8</td>
<td>118.9</td>
</tr>
<tr>
<td>Refractive Index</td>
<td>1.55</td>
<td>NA</td>
<td>1.47</td>
<td>NA</td>
</tr>
<tr>
<td>Incision Size</td>
<td>2.4 mm</td>
<td>2.2 mm</td>
<td>2.2–2.4 mm</td>
<td>2.0 mm</td>
</tr>
<tr>
<td>Diopter Range</td>
<td>+6.0 to +30.0 D, 0.5 D increments</td>
<td>+4.0 to +30.0 D, 0.5 D increments</td>
<td>+5.0 D to +34.0 D, 0.5 D increments</td>
<td>+6.0 to +30.0 D, 0.5 D increments</td>
</tr>
</tbody>
</table>
## Preloaded Systems

<table>
<thead>
<tr>
<th>AcrySert with AcrySof® SN60WF (Alcon)</th>
<th>ACCUJET with CT LUCIA® 601P (ZEISS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Itec with Tecnis® PCB00 (AMO)</td>
<td>iSert® with Vivinex XY1 IOL (HOYA)</td>
</tr>
</tbody>
</table>
Results

- All intraocular lenses could be implanted without complications
- Unfolding time ranged from 30 sec to 120 sec
- Several hydrophobic lenses presented with adhesions of the haptics to the anterior or in some cases even the posterior surface of the optic
- Stickiness was different between the different types of hydrophobic materials
- No damage to optics or haptics due to the implantation process occurred
- All cartridges were analyzed using light microscopy and in some cases during IOL delivery damage of the nozzle of the cartridge occurred
Statistical evaluation of implantation behavior

SN60WF (N=19)
CT Lucia 601P (N=26)
PCB00 (N=24)
iSert 254 (N=19)
Complications during Implantation

- iSert 254 (N=19):
  - Centration Problems: 8%
  - Haptic Problems: 8%

- Tecnis PCB00 (N=24):
  - Centration Problems: 0%
  - Haptic Problems: 24%

- CT LUCIA 601P (N=26):
  - Centration Problems: 0%
  - Haptic Problems: 11%

- AcrySof SN60WF (N=19):
  - Centration Problems: 15%
  - Haptic Problems: 25%

“Handshaking Haptics”

“Haptic behind optic”
Injector cartridge damages

- **Alcon MONARCH III Cartridge** (N=16)
- **Alcon AcrySert Injector** (N=15)
- **Zeiss ACCUJECT Injector** (N=15)
- **AMO Tecnis iTec Injector** (N=20)
- **Hoya iSert Injector** (N=15)

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<table>
<thead>
<tr>
<th>Damage Type</th>
<th>No Damage</th>
<th>Slight Scratches</th>
<th>Deep Scratches</th>
<th>Extensions</th>
<th>Cracks</th>
<th>Burst</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcon MONARCH III Cartridge</td>
<td>1</td>
<td>8</td>
<td>15</td>
<td>10</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Alcon AcrySert Injector</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Zeiss ACCUJECT Injector</td>
<td>0</td>
<td>2</td>
<td>7</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>AMO Tecnis iTec Injector</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Hoya iSert Injector</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Conclusions

- Implantation and unfolding behavior among hydrophobic intraocular lenses revealed large variability.

- Haptic adhesions to the optic (“Handshaking Haptics”) can be of clinical significance, especially in complicated cases.

- Injector cartridge damages occurred for the majority of cartridges.