IOL Fixation After Exchange
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When?
- Malfunction
- Unwanted optical images: glare, halo, dysphotopsia
- Wrong IOL power
- Neuro-adaptation problems
- Uveitis-glaucoma-hyphema
- Bullous keratopathy
- IOL opacification
- Malposition
- Decentration
- Subluxation
- Dislocation

Lenticular lens explantation and exchange
A review of less stable, clinical indications, clinical results, and visual outcomes
Nish Mehta, M.D., Alan S. Graif, M.D., Mark W. Pelphrey, M.D., Steven Bolstein, B.S., William E. Monihan, M.D.
Before and After Exchange

- IOL opacification 31%
- IOL decentration 19%
- IOL dislocation 18%
- Capsule phimosis
- Capsule endothelial cell decompensation 8%
- Wrong IOL power
- Damaged IOL
- IOL related complications

- Dislocation/Decentration of the IOL
- Incorrect IOL power
- Glare-optical aberrations
- Iritis-UGH Syndrome
- IOL calcification

Posterior Chamber Lenses

<table>
<thead>
<tr>
<th>Indication</th>
<th>Eyes n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IOL decentration-dislocation</td>
<td>29 (85.3)</td>
</tr>
<tr>
<td>Refractive error</td>
<td>2 (5.7)</td>
</tr>
<tr>
<td>UGH syndrome</td>
<td>1 (3)</td>
</tr>
<tr>
<td>Persistent iritis</td>
<td>1 (3)</td>
</tr>
<tr>
<td>Glare</td>
<td>1 (3)</td>
</tr>
</tbody>
</table>
Anterior Chamber Lenses

<table>
<thead>
<tr>
<th>Indication</th>
<th>Type (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uveitis Syndrome</td>
<td>4 (26.7)</td>
</tr>
<tr>
<td>Persistent iritis</td>
<td>4 (26.7)</td>
</tr>
<tr>
<td>IOL dislocation-inclusion</td>
<td>2 (13.3)</td>
</tr>
<tr>
<td>Refractive error</td>
<td>2 (13.3)</td>
</tr>
<tr>
<td>Chronic iridocorneal syndrome</td>
<td>1 (6.7)</td>
</tr>
<tr>
<td>Pseudophakic glaucoma</td>
<td>1 (6.7)</td>
</tr>
<tr>
<td>Glaucoma</td>
<td>1 (6.7)</td>
</tr>
</tbody>
</table>


Implanting a Lens After Exchange

Where to implant the IOL
- Anterior chamber IOLs:
  - Angle-supported
  - Intact lens
- Posterior chamber IOLs:
  - Scleral-fixed IOLs
  - End-fixed IOLs

### Anterior chamber lenses

**Advantages**
- Shorter operation time
- Technically easier to implant
- Less traumatic to the eye during implantation
- Decreased endothelial cell loss, pain, UGH syndrome compared to previous designs

**Disadvantages**
- Endothelial cell loss
- Iris tuck
- Oval pupil
- Inflammation
- Aniseikonia
- Necessitates iris support

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### Suturing PC-IOLs

**Advantages**
- Less endothelial cell loss
- Closer to the nodal point of the eye

**Disadvantages**
- Much more challenging
- Vitreous hemorrhage
- Retinal detachment
- Tilt and decenteration of the IOL
- Suture complications

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### Scleral Fixation
**Ab interno scleral fixation**
- First pass the long needle under the iris, aim for the ciliary sulcus
- Needles exit under previously dissected flaps
- Sutures can be tied to the haptics or eyelets
- After exiting, the sutures are tied. Aim for appropriate suture tension

**Ab Externo Scleral Fixation**
- Long straight needle pass through the sclera under the flaps
- The needle is docked inside the tip of a 27-28 gauge needle passing from the opposite side
- Hollow needle is withdrawn
- Suture is pulled out through a superior wound, cut in half
- Ends are tied to the haptics of the IOL

**Techniques for Repositioning- Scleral Fixation**

<table>
<thead>
<tr>
<th>Ab interno scleral fixation</th>
<th>Ab externo scleral fixation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faster</td>
<td>Anterior chamber remains closed during the pass of the needle</td>
</tr>
<tr>
<td>The suture is passed under the iris without direct visualization</td>
<td>Operation time is longer</td>
</tr>
<tr>
<td></td>
<td>Harder especially with 4 point fixation</td>
</tr>
</tbody>
</table>
Sclerally Sutured PCIOls

Transscleral fixation
- Suture problems ➔ Use 8-0 Gore-tex or 9-0 Prolene
- Hoffman scleral pocket method
  Rotating the sutures
  Use of fibrin glue for fixing the haptics under flaps
- Tilt or decenteration ➔ 4 point fixation approach
  Endoscopic methods
  Endoilluminator guided fixation

Techniques for Repositioning-Iris Suture Fixation
- McCannel: transscleral retrievable suturing technique
- Siepser: closed chamber slipping technique for repair of iris defects
- Tying an intracocular knot through a stab incision within a closed chamber with negligible movement of the IOL and iris

Iris suture

- Glaucoma patients
- AC IOL inadvisable
- Conjunctiva should be preserved for possible filtration surgery
- Filtering bleb
- Topical anesthesia adequate

Iris suturing

Advantages
- Low incidence of CME, pupillary block, IGH and PBK
- Less endothelial cell loss
- Closer to the nodal point

Disadvantages
- Pigment dispersion
- Technically difficult
- Limited pupillary dilation
- Requires sufficient iris tissue
Study Design

- Private practice, Los Angeles
- To evaluate the intra-operative features and post-operative results of 2 different surgical techniques for IOL fixation after IOL exchange
- Retrospective interventional series
- 60 eyes of 59 patients

Primary Outcome Measures

- Prolonged post-operative intraocular inflammation and/or pigment dispersion
- Ocular hypertension/ worsening of existing glaucoma
- Vitreous hemorrhage
- Secondary dislocation/ need for re-intervention
- Cystoid macular edema
- Retinal detachment

Demographics

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>59</td>
</tr>
<tr>
<td>Number of eyes</td>
<td>60</td>
</tr>
<tr>
<td>Mean follow-up time</td>
<td>12.3 months (range: 4-46)</td>
</tr>
<tr>
<td>Mean age</td>
<td>75 (range: 50-94)</td>
</tr>
<tr>
<td>Right/Left</td>
<td>28/32</td>
</tr>
<tr>
<td>Male/Female</td>
<td>31/29</td>
</tr>
<tr>
<td>Mean interval between Cataract Surgery and Reposition</td>
<td>4.87 years (range: 0.5-26 years)</td>
</tr>
</tbody>
</table>
### Risk Factors of the Patients

<table>
<thead>
<tr>
<th>Factor</th>
<th>% of eyes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pseudophakia</td>
<td>9 (19%)</td>
</tr>
<tr>
<td>High Axial Length (&gt;26 mm)</td>
<td>5 (2.1%)</td>
</tr>
<tr>
<td>Retinopathy Pigmentosa</td>
<td>3.5%</td>
</tr>
<tr>
<td>Mellar Syndrome</td>
<td>5 (1.6%)</td>
</tr>
<tr>
<td>Trauma History</td>
<td>2 (3.3%)</td>
</tr>
<tr>
<td>Previous Vitreoretinal Surgery</td>
<td>4 (6.7%)</td>
</tr>
</tbody>
</table>

### Results

<table>
<thead>
<tr>
<th>Complication</th>
<th>N of eyes w ISF</th>
<th>N of eyes w SIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prolonged Inflammation</td>
<td>2 (6.5%)</td>
<td>-</td>
</tr>
<tr>
<td>Uveitis</td>
<td>7 (22.6%)</td>
<td>3 (10.3%)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>-</td>
<td>4 (13.8%)*</td>
</tr>
</tbody>
</table>

* * * p=0.032

<table>
<thead>
<tr>
<th>Complication</th>
<th>N of eyes w ISF</th>
<th>N of eyes w SIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary Dislocation</td>
<td>3 (9.7%)</td>
<td>2 (6.9%)</td>
</tr>
<tr>
<td>Detached Macular Edema</td>
<td>1 (3.2%)</td>
<td>-</td>
</tr>
<tr>
<td>Retinal Detachment</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

p=0.05
Results

Iris Suture Fixation
- Post operative inflammation
- Ocular Hypertension
- Secondary Dislocation

Scleral Suture Fixation
- Vitreous hemorrhage
- Statistically significant
  \[ p=0.032 \]

Conclusion

- Safe and effective methods
- Case selection- surgical technique are crucial
- Randomized studies with longer follow up periods are needed.

Thank you for your attention.