Outcomes of Phakic IOL Exchange

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Vault of an ICL is calculated using

- WTW (White to White)
- ACD (Anterior Chamber Depth)

**Ideal Vault (mm)**
- Myopes: 500–600
- Hypermetropes: 200–300
FDA study: Recommended ICL diameter by WTW and ACD measurements

<table>
<thead>
<tr>
<th>White to White (mm)</th>
<th>ACD (mm)</th>
<th>Recommended ICL Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10.5</td>
<td>&lt;=3.5</td>
<td>Not Recommended</td>
</tr>
<tr>
<td>10.5-10.6</td>
<td>&gt;3.5</td>
<td>12.1</td>
</tr>
<tr>
<td>10.7-11.0</td>
<td>All</td>
<td>Not Recommended</td>
</tr>
<tr>
<td>11.1</td>
<td>&lt;=3.5</td>
<td>12.6</td>
</tr>
<tr>
<td>11.1</td>
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</tr>
<tr>
<td>11.2-11.4</td>
<td>All</td>
<td>12.6</td>
</tr>
<tr>
<td>11.2-11.4</td>
<td>&lt;=3.5</td>
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<tr>
<td>12.2</td>
<td>All</td>
<td>13.2</td>
</tr>
<tr>
<td>12.3-12.9</td>
<td>All</td>
<td>13.7</td>
</tr>
<tr>
<td>&gt;=13</td>
<td>All</td>
<td>Not Recommended</td>
</tr>
</tbody>
</table>
LIMITATIONS

 Poor correlation between White to White (WTW) and Sulcus to Sulcus (STS)
AIMS AND OBJECTIVES

• The implantable collamer lens (Staar Surgical AG) is FDA approved for correction of myopia but not for compound myopic astigmatism
• We present the outcomes following exchange of the Visian Toric Implantable Collamer lens (TICL) in 2 cases of high vault

MATERIALS AND METHODS

• Retrospective outcomes assessment
• Both cases have completed one year follow-up
• Surgeries performed by a single surgeon.
• ICL Power/Sizing using Staar Surgical's software

RESULTS

• 2 eyes of 2 patients
• Mean follow-up
  – till date of ICL exchange: 71.5 days
  – Since ICL exchange: 1 year
  – In contralateral eye: 1 year
• Mean change in ECD
  – after exchange was 125.5 cells/mm³
  – in the contralateral eye with the undersized ICL was 46 cells/mm³
• No change in lens opacity was evident from the stable Pentacam lens density (Change: 0.3)
• IOP & angle evaluation:
  – No significant difference from baseline & from contralateral eye

0.5 mm reduction in the size of the exchanged ICL diameter reduced the vault by average of 0.547 um
Case 1: RA/22/M
WTW: 11.8mm, ACD: 3.17mm
OD TICL: -20DS/+2DC x 108°
Overall diameter: 12.5mm
TICM 125 V4B

POST OP 1 week:
UDVA: 6/6p
Vault: 2.5 – 3 CT
Specular: 3036

Repeat UBM: check haptic position
Nasal: Haptic abutting ciliary process
Temporal: Haptic in the ciliary sulcus
ACD: 1.804 mm
Vault: 1.308 mm

Treatment plan:
ICL Exchange undersizing by 0.5 mm
(Preop UBM – 12.1mm)
Therefore assuming a desirable vault of 0.5mm for a V4B ICL
Size of 12mm would have been ‘Ideal’

Cause of high vault:
? Fault in size due to
WTW and STS mismatch
**OD TICL Exchange:**
- 20DS/+2DC x 118°
- TICM 120 V4

**Post op 6 months:**
- Vault: 0.627mm
- Specular: 2924

**OS:**
- WTW: 11.8 mm
- STS: 12.1 mm

ICL size: 12mm chosen
In OS the ICL size suggested by the WTW was 12.5mm

But

Considering the experience in OD the ICL was undersized to 12mm

VAULT in both eyes after under-sizing was ideal
Case 2: AS/26/M

- WTW (Orbscan & Digital Caliper)
  - OD: 11.8mm
  - OS: 11.8mm

- ICL
  - OD: 12.5 mm -> 12.0mm
    (exchanged for 0.5 mm smaller dia ICL)
  - OS: 12.0
    (primarily undersized considering OD ICL exchange)

- Vault
  - OD: 1.308 mm -> 0.61mm
    Change in vault=0.689mm
  - OS: 0.579 mm
VISUAL ACUITY & QUALITY METRICS

Case 1
• OD: UDVA: BASELINE, post TICL & post TICL exchange: 6/6
• OS: UDVA: BASELINE, post TICL: 6/6

Case 2
• OD: UDVA: BASELINE, post TICL & post TICL exchange: 6/6
• OS: UDVA: BASELINE, post TICL: 6/6

QUALITY METRICS
• Point spread function and MTF are comparable in the 2 eyes s/p ICL exchange and in the 2 eyes s/p primary ICL
How do I prevent this?

If diff < 0.25mm:
Eg: ICL 12.0
STS 11.75 to 12.25 mm
PROCEED with the same ICL dia

If diff ≥ 0.25mm:
ADJUST SIZE ACCORDING TO STS
ICL 12.0 &
STS < 11.75 mm: UNDERSIZE
STS > 12.25 mm: OVERSIZE

Calculate ICL size according to WTW
Pre-op UBM: STS measure
Correlate ICL size with STS

CAUTION with UBM STS measurements:
Very highly operator dependent
• WTW based sizing of the ICL is occasionally prone to vault abnormalities.
• ICL exchange is the only solution
• Need for ICL exchange can be reduced by pre-op STS measurements by Ultrasound biomicroscopy
• We were able to document that the ICL exchange is safe and effective
  – Change in ECD was marginally higher in eyes with exchange
  – IOP and angle structures were the same
  – VISUAL ACUITY & VISUAL QUALITY METRICS were comparable

THANK YOU