When To Laser, When To Implant, When To Do Both

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Refractive Surgery Options:

- Human Lens Extraction with IOL: Clear Lens Extraction (CLE) or Refractive Lens Exchange (RLE)
- LASIK or PRK
- Phakic IOL (PIOL)
- Combination PIOL & LASIK (or PRK) - Bioptics
Refractive Lens Exchange (RLE) or Clear Lens Extraction (CLE)

- High hyperopia: $\geq 5$ Diopters
  - Consider Refractive Lens Exchange - 61% of AAO ISRS respondents recommended Refractive Lens Exchange
Preferred Surgery For 45 yo +5.00 D Hyperope

Duffy, 2006 Survey Data
Myopic Refractive Surgery

- Total US Population = 286,158,000
  - Myopic = 72,000,000 (25%)
    - Mild (<-2.00 D) = 46,080,000 (64%)
    - Moderate (-2.00 to -6.00 D) = 23,040,000 (32%)
    - High (> -6.00 D) = 2,880,000 (4%)

- LASIK and PRK for >10D myopia not always advisable
Clear Lens Extraction or Refractive Lens Exchange (RLE) vs Phakic IOL

High Myopia:

- With Clear Lens:
  - Clear Lens Extraction: Generally not accepted - 8% RD Rate (1. Collin, 2. Ripandelli)
  - Phakic IOL or PRK/LASIK

- With Moderate Cataract ("Not So Clear Lens Extraction") in older patient - consider lens extraction or observe
Preferred Surgery For 30 yo -10.00 Diopter Myope

- Duffy, ISRS 2006 Survey Data
Phakic IOL’s

- Visian Staar Collamer - Posterior Chamber Lens (inserted in front of human lens in Sulcus)
- Verisyse (Artisan) – Iris Clip Lens
Visian Staar Collamer Phakic IOL

- Posterior Chamber Phakic IOL
- Efficacy results:
  - Sanders: FDA 59% UCVA 20/20 (3yrs. PO)
  - Similar to Verisyse 50% UCVA 20/20
- Easier to implant:
  - Smaller incision
  - No Iris Enclavation
Visian Staar Collamer Phakic IOL (Intraocular Contact Lens - ICL)

Safety Studies:
- 1. Sanders et al*.,
  - 526 eyes, 3 years:
    - 3.6% of eyes cataracts (2.7% ant. subcapsular)
    - 0.6% lens removal rate,
- 2. Lackner et al**:
  - 75 eyes
  - 33% anterior subcapsular opacities
  - 18.7% progressive opacities, mean interval for opacification – 27 months
  - 10.7% required lens removal

*Ophthal. 03
**Ophthal. 03
The Verisyse™ Phakic IOL for the Correction of Myopia: (-5 TO -20 D)
Verisyse PIOL Uncorrected Visual Acuity

First Eyes at Three Years

- All first eyes (n=231)
- First eyes targeted for emmetropoia and pre-op BCVA 20/20 or better (n=88)

Uncorrected Visual Acuity

Percentage of Eyes

- 20/20 or better: 31%
- 20/25 or better: 50%
- 20/30 or better: 68%
- 20/40 or better: 82%
- 20/40 or better: 84%
- 92%

0 10 20 30 40 50 60 70 80 90 100

20/20 or better 20/25 or better 20/30 or better 20/40 or better
Verisyse Iris Clip Phakic IOL 1,6 & 10 Years Postop*

- 89 eyes of 49 patients (mean -11.00D Preop)
- Efficacy Index 0.8, Safety Index 1.1
- Endo Cell Loss: 8.6% at 10 years no increase from 6 yr. eval.
- 2 line BCVA loss: 2 eyes
  - 1 Eye Myopic Maculopathy
  - 1 Eye Fuch’s Dystrophy with vision loss
- Visually significant age related cataract 2 eyes - 6 years post PIOL (lens removed and CE with IOL successfully done)
- Overall patients were satisfied

*Tahzib, Nuijts et al, Ophthal. Jan 07
VISX High FDA Myopia LASIK Study

- Mean preop sphere: -7.95 Diopters (mostly > 50%, 7-8 diopters)
- 84% UCVA 20/20 or better – 6 months post
- 77% ± 0.50 Diopters Sphere – 6 months
- 0% 2 line BCVA loss
### Danasoury Phakic IOL vs LASIK

**One-Year Outcomes: Ophthal. 2001**

<table>
<thead>
<tr>
<th></th>
<th>Verisyse™ (n=43 eyes)</th>
<th>LASIK (n=41 eyes)</th>
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</thead>
<tbody>
<tr>
<td><strong>Mean Preop Refraction</strong></td>
<td>-13.9 D</td>
<td>-13.4 D</td>
</tr>
<tr>
<td><strong>Mean SE Refraction</strong></td>
<td>-0.64 ± 0.8 D</td>
<td>-0.87 ± 0.8 D</td>
</tr>
<tr>
<td><strong>UCVA 20/20 or better, %</strong></td>
<td>20.9</td>
<td>12.2</td>
</tr>
<tr>
<td><strong>UCVA 20/40 or better, %</strong></td>
<td>88.4</td>
<td><strong>58.5</strong></td>
</tr>
<tr>
<td><strong>2 or more Snellen lines lost on BSCVA, %</strong></td>
<td>0.0</td>
<td><strong>14.6</strong></td>
</tr>
<tr>
<td><strong>2 or more Snellen lines gained on BSCVA (n)%</strong></td>
<td>16.3</td>
<td>2.4</td>
</tr>
<tr>
<td><strong>Contrast sensitivity ↓2 or more lines (n)%</strong></td>
<td>4.7</td>
<td>14.6</td>
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LASIK and PRK vs PIOL

- Laser simpler procedures than Phakic IOL, not intraocular (no PI’s, glaucoma, cataract)
- Preferable for myopes -6.00 – 10.00 D unless:
  - Thin Corneas
  - Ectasia, KC
  - At risk for severe dry eye Sjogren’s, RA
  - Myopia likely to progress outside range of LASIK/PRK given age, myopic history
Combining Phakic IOL with LASK/PRK – Biooptics Procedure

- Zaldivar first used combination of PIOL with Staar Collamer ICL because of high myopia > 18 D being undercorrected
- Bioptics:
  - Reduce residual sphere or astigmatism post PIOL
Summary: When to Zap, When to Implant When to Combine Both

- High Hyperopia: \(\geq 5.00\) D Consider Refractive Lens Exchange

- High Myopia:
  - LASIK/PRK or Phakic IOL
  - Up to -10.00 D Consider LASIK/PRK depending on anatomy, age
  - \(\geq 10.00\) D Phakic IOL more likely to give good optics