Timing of Intraocular Lens Implantation in Children

- **Early** 1\textsuperscript{st} year
- **Late** 2 yrs or older

**Early IOL Implantation**

- Advances in surgical technique
- Improvement in IOL material
- Better understanding of eye growth
Bilateral Cataract

➢ 12 months:
  
  Postoperative Refraction + 3D-4D

Why?

➢ Bilateral Cataract:
  
  - Immediate constant correction
  - ↓ Dependence on compliance
  - Less ongoing expenses
  - Better optics
Can Contact Lenses Do the Trick?

- Considerable care required
- Inconsistency: loss, infection
- Expense: frequent power change
- Drop out rate: 44%

[Assaf et al., 1994]

Can Contact Lenses Do The Trick?

Infant Aphakia Treatment Study:

In 1st year:
- Replacement:
  . Silicone: 10.9(2-24)
  . RGP: 16.8(8-32)
- Adverse events:
  . corneal abrasion
  . bacterial keratitis
  . corneal opacity

(Russel et al, 2012)
Can Aphakic Glasses Do the Trick?

- Poor optics:
  - Narrow visual field
  - Ring scotoma
  - ↑nystagmus amplitude
- Extra weight + size
- Undesirable cosmetic/ psychological effect
- Poor fit
Cons of Early IOL Implantation

- Appropriate power selection
- Visual axis opacification (VAO)
- Greater tissue reactivity

Keratometric Changes In First Year

- 51.2D - 44D

Gordon and Donzis, 1985
Axial length changes and Myopic Shift

- From birth-12 months: 16.8-20 mm

Formula: \(-7.97 + 0.05 \times \text{age at surgery} + 0.97 \times \text{laterality}\)  
(*Haevenaars et al, 2011*)

- Underpowering IOL: at 1 yr. \(\rightarrow +3 - +4D\)
- Give the residual + error in glasses (Low power)

Myopic Shift

- 4 D myopia:
  
  Is this bad?

- Myopic shift:
  
  - Greater in unilateral pseudophakia
  
  - Greater below age 1 yr. (*Cornejo, 2017*)
Prediction Error

. Mean absolute prediction error: 1.08 D+/-0.93D

. Greater prediction error: - Corneal radius < 7.3mm
  (Moore et al,2008)
  - Age at surgery
  .SRK-T and SRKǁ formulae were better (P≤ 0.035)
  (Shuaib et al,2019)

What Gave Early Implantation a Bad Name?

➢ Lundvall and Zetterstrom (2006)
  - 31 eyes:
    ▪ Median age: 2.5 months
    ▪ Range : 8 days -10 months
    ▪ 30% : ≤ 18 days
    ▪ 22% : > 6 months
  - Results:
    ▪ VAO: 70%
    ▪ Vitreous hge, RD, strabismus, IOL dislocation
Visual Axis Opacification (VAO)

- Incidence: 37.9% (Trivedi et al., 2004)
- Results analysis:
  - Average age: 3.8 ± 3.0 months
  - No VAO: 5.4 ± 4.0 months
  - Significant correlation:
    - Anterior segment dysgenesis
    - Iris hypoplasia
    - PFV

Does Primary IOL Implantation Protect Against Glaucoma?

<table>
<thead>
<tr>
<th></th>
<th>Pseudophakic</th>
<th>Aphakic</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. (eyes)</td>
<td>73</td>
<td>53</td>
</tr>
<tr>
<td>Mean follow-up (yrs)</td>
<td>6.1</td>
<td>7.24</td>
</tr>
<tr>
<td>Glaucoma</td>
<td>1(1.37%)</td>
<td>11(20.75%) (Asrani et al, 2000)</td>
</tr>
</tbody>
</table>
Cairo University Children’s Hospital Database

- 23/206 eyes (11%) in 1st year
- 11/86 eyes (13%) in 2nd year

Aphakia
1st year: 17(74%)
2nd year: 11(13%)

Pseudophakia
1st year: 6(26%)
2nd year: 0
(Gouda et al, 2019)

Why 1ry IOL Implantation May Reduce The Incidence Of Glaucoma

- Chemical theory:
  . Minimizes passage of vitreous chemicals injurious to trabecular meshwork
- Mechanical theory:
  . Reduces disorganization of trabecular meshwork caused by loss of support in aphakia
So Are You With Me?