

# IOL Implantation in Paediatric Age Group

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The main aim of cataract surgery in childhood is to prevent or manage amblyopia and to maintain clear visual axis throughout life.

Cataract surgery with IOL implantation has now been accepted as a best recognized modality in the management of aphakia in this age group.

## How does paediatric cataract surgery differ from adult?

Difficulties are encountered during pre-operative, intra-operative and post-operative period.

### Preoperative difficulties

1. Late diagnosis
2. Difficulty in visual acuity assessment
3. Associated conditions like prematurity and systemic disorders
4. Some risk factors for general anaesthesia

### Intra-operative difficulties

1. Smaller size of eyes
2. Poorly dilating pupil
3. Highly elastic anterior capsule
4. Low scleral rigidity
5. Dense vitreous giving rise to raised intravitreal and intralenticular pressure

### Postoperative difficulties

1. Requires repeated short term anaesthesia
2. Higher rate of postoperative inflammation
3. Posterior capsular opacification
4. Constantly changing refractive status due to growth of eye
5. Tendency to develop amblyopia

## Timing for cataract surgery and IOL implantation

No age bar for cataract surgery and IOL implantation if child is fit for general anaesthesia.

## Indications (for cataract surgery)

Some important indications for performing cataract surgery in paediatric age group are -

1. Unilateral or bilateral total cataract
2. Central cataract of more than 3 mm diameter
3. Dense nuclear cataract
4. Cataract obscuring view of fundus or preventing refraction of patients
5. The contralateral cataract has been removed
6. Cataract with strabismus and nystagmus

## Optical rehabilitation

There is a range of options for this purpose including spectacles, contact lenses, corneal refractive surgeries like keratophakia and IOL implantation.

Problems with spectacles, contact lenses and refractive surgeries have prompted some surgeons to advocate IOL implantation either primarily or secondarily for optical rehabilitation.

Aim of IOL implantation for optical rehabilitation is to correct most, but not all of the aphakia, the residual refractive error has to be corrected by using spectacles or contact lenses which can be adjusted throughout life.

## IOL implantation

With the advent of newer microsurgical technique and specially designed IOL for paediatric age group the complication rate reduced significantly.

1. Proper management of anterior capsule, posterior capsule and anterior vitreous
2. Improved surgical technique to ensure capsular bag fixation of an IOL
3. Availability of appropriate sized, more flexible implants made up of PMMA and an acrylic foldable lens which can be inserted easily in the capsular bag

## Choice of IOL - type, size, placement

1. In-the-bag IOL implantation preferred
2. Ciliary sulcus fixation of an IOL
3. Iris fixed lens and Worst-Daljit lens
4. Anterior chamber and iris supported lenses - not preferred

## Choice of material

1. One piece PMMA lens
2. Heparin coated PMMA lens
3. Foldable acrylic lens

## Size of IOL

- 10-11 mm below the age of 2 years
- 12-12.5 mm between 2-8 years of age

## IOL power selection

Both the biometry and age of the child determine choice of IOL power.

We can divide children into 2 age groups:

- Those younger than 2 years
- Those between 2-8 years of age

Those less than 2 years -

- Do biometry and undercorrect by 20%
- Use axial length measurement only

Axial length in mm	IOL Power in diopters
17	28
18	27
19	26
20	24
21	22

Those between 2-8 years -

Do biometry and undercorrect by 10%

### **Surgical techniques**

Techniques used in the past -

1. Descission
2. Needling
3. Schie's procedure

They were not adequate to maintain clear visual axis for a long time due to development of PCO.

### **Newer techniques**

1. Lensectomy and anterior vitrectomy
2. Extra-capsular cataract extraction with or without posterior chamber IOL implantation
3. ECCE with primary posterior capsulotomy with PC IOL
4. ECCE with primary posterior capsulotomy with anterior vitrectomy with PC IOL
5. ECCE with posterior capsulorhexis with optic capture

### **Postoperative complications and management**

#### **A. Capsular bag opacification**

1. Most common complication in this age group
2. It is amblyogenic
3. Measures to reduce incidence of PCO -
  - Newer surgical techniques
  - Through removal of lens epithelial cells and cortical matter
  - Convex posterior or biconvex square edged PMMA lens
  - Use of I/V heparin in irrigating fluid

#### **Treatment**

1. Surgical capsulotomy
2. ND-YAG LASER capsulotomy

#### **B. Uveitis**

1. It is a common complication due to increased tissue reactivity in children
2. Uveitis results in fibrinous membrane formation, pigment deposits on IOL and posterior synechia formation.
3. Measures to reduce incident of uveitis - Minimal iris manipulation and capsular bag fixation of IOL, use of IV heparin in irrigation fluid during operation, use of heparin coated IOL.
4. Frequent use of topical steroid and even systemic steroid
5. Secondary membrane can be opened with ND-YAG capsulotomy or by surgical membranectomy and vitrectomy.

#### **C. Pupillary capture**

1. Capsular bag fixation of IOL prevents pupillary capture
2. Pupillary capture occurs most often in children <2 years, with optic size <6 mm and with ciliary sulcus fixation IOLs.
3. It can be left untreated.

#### **D. Residual refractive error**

1. Residual hypermetropia can cause amblyopia
2. Residual refractive error is corrected by spectacles or contact lenses
3. Corneal refractive surgeries for correction of significant late myopia
4. Piggy back foldable intraocular lens in infants
5. Explantation of IOL if needed

#### **E. Amblyopia**

Amblyopia is the greatest sight threatening complication.

To prevent reverse amblyopia -

1. Cataract should be operated at the earliest
2. Optical rehabilitation should be done at the earliest
3. Postoperative occlusion therapy.