I have no financial interests
Surgical Correction of Aphakia

Outline:

I  Background and history of IOLs
II Correction of Aphakia in eyes with no capsular support
III Correction of Aphakia in eyes with partial capsular support
1. **Brief History of Cataract Surgery and IOLs**

1949-70s early pioneers

- Harold Ridley (UK)
- Edward Epstein (South Africa)
- Warren Reese (USA)
- Peter Choyce (UK)
- Cornelius Binkhorst (Holland)
- Jan Worst (Holland)
- Benedetto Strampelli (Italy)
- Joachin Barraquer (Spain)
- Svystoslav Fyodorov (Soviet Union)
Surgical Correction of Aphakia

Early adapters of IOLs in Cataract Surgery

1980s

many more innovators and lens designs
The Earliest IOLs

• Were used with intra-capsular surgery leaving no capsular support
  • Using angle support
  • Or iris support
Second Generation IOLs

- Were designed for extra-capsular surgery
  - First using a combination of iris and capsular support
  - Or only iris support
  - Then only capsule support
Two Loop Irido-capsular IOL
IOL Loop Sutured to Iris
IOL Loop Sutured to Capsule

Suture to capsule
Belt and suspenders fixation

Lower loop between capsules
Upper loop also stitched to the capsule
Surgical Correction of Aphakia

Part II  Correction of Aphakia in eyes with no capsular support
Surgical Correction of Aphakia

Intra-capsular Cataract Extraction

Lens removed in one piece, including the lens capsule
Surgical Options

Options for correction of Aphakia in eyes with no capsular support

• Epikeratophakia
• Iris supported IOLs
• Angle supported IOLs
• Scleral supported IOLs
• Capsule supported IOLs
Surgical Correction of Aphakia

Epikeratophakia

• Used as a surgical option by some for the correction of pediatric aphakia secondary to removal of congenital cataract

Surgical Correction of Aphakia

Diagram showing the anatomy of an eye with a graft, Bowman's membrane, epithelium, endothelium, donor tissue, and lens. The term "Aphakia" is also indicated.
Surgical Correction of Aphakia

Iris Claw Fixated IOL

- Artisan Phakic IOL (Verisyse IOL, AMO, Netherlands)


Surgical Correction of Aphakia

Artisan Myopia Lens
Surgical Correction of Aphakia

Iris Claw Fixated IOL

- **Artisan Phakic IOL** (Verisyse IOL, AMO, Netherlands)

- The safety and efficacy of Artisan phakic IOL implants have been reported recently in several studies

  Reported problem: disenclavation

  Repositioning or re-enclavation has been successful


Surgical Correction of Aphakia

Angle supported IOLs

Pre-op: specular microscopy

Gonioscopy to rule out anterior synechiae
Surgical Correction of Aphakia

Gonioscopy at surgery to confirm loop placement
Surgical Correction of Aphakia
Surgical Correction of Aphakia

Iris-Sutured PC-IOL
Scleral Supported IOLs

- PC IOLs sutured to the sclera through sulcus
  - Widely used technique if there is no capsule or only sections of peripheral capsule
  - No endothelial risk
  - Low risk of iris chaffing
  - Some risk of suture breaking
  - Some risk of suture erosion
Modified Haptics
Surgical Correction of Aphakia

Scleral-Sutured PC-IOL

*Figure 6.* Prolene sutures for each haptic are tied, allowing the knot to slide under the roof of the scleral pocket.
2003 AAO Report: IOL Implantation in the Absence of Capsular Support

- Open-loop AC IOLs
- Scleral-sutured PC IOLs
- Iris-sutured PC IOLs

-all are safe and effective in correcting aphakia in eyes without capsular support
2005 ASCRS-ESCRS Report: AC-IOL and Sutured PC-IOL in eyes with poor capsular support

- Findings suggest no significant differences in outcome exist between AC-IOL and sutured PC-IOL in the absence of capsular support

Surgical Correction of Aphakia

Part III. Intraocular Lens Implantation when there is adequate Capsular Support

• Simple sulcus placement
• In the re-opened bag
• Optic Capture through opening in the membrane
• Capsule Membrane Suture to fix the IOL to the capsule
Surgical Correction of Aphakia

Extra-capsular Cataract Extraction

Capsular Support
Surgical Correction of Aphakia

Extra-capsular Cataract Extraction

Maintains a ciliary sulcus with zonular attachments to a fused anterior and posterior capsular for:

a) Simple sulcus IOL support
b) Optic capture by an opening in the membrane
c) Suture fixation to the membrane
Simple Sulcus placement has its issues

Transillumination defects from mobile sulcus placed IOL
Surgical Correction of Aphakia

IOL stabilized by Optic Capture after Soemmering’s Ring emptied
Surgical Correction of Aphakia

In-the-bag placement

- Possible especially when done soon after original surgery

Examples:
  - primary surgery aborted due to high vitreous pressure and iris prolapse

- Late Soemmering’s ring evacuation and IOL placement in the newly opened peripheral bag
Surgical Correction of Aphakia

Capsular Bag "Fixation"
Capsule remnant used for fixation by using an existing or new opening in the central part of the capsule.

MOC (pushing optic through the opening and leaving the haptics in front of the opening to grasp “capture” the lens)
Surgical Correction of Aphakia

IOL Optic Capture

- Optic Capture by Capsular Membrane

- haptics in sulcus

Optic behind the Membrane
Surgical Correction of Aphakia

Capsule Membrane Suture (CMS)
Fixation of IOL
Suturing of IOLs haptics to capsular membrane is used for capsule fixation when optic capture cannot be used.

As in this case with extensive fibrosis of the capsular membrane.
Surgical Correction of Aphakia

IOL Sutured to the Capsule is like “coming full circle”

Insurance suture to capsule

Binkhorst two loop Irido-capsular IOL
Surgical Correction of Aphakia

Capsular Membrane Suture (CMS) Fixation

Gimbel HV et al. Capsular Membrane Suture Fixation of Sulcus IOLs.
Surgical Correction of Aphakia
Summary

- Many Options for correcting Aphakia:
  - Epikeratophakia
  - Angle supported IOLs
  - Iris supported IOLs
  - Scleral supported IOLs
  - Capsule supported IOLs
Summary

• Choice of Option depends on anatomical situation and age of the patient

• Epikeratophakia—used by some in pediatrics

• Angle supported IOLs low risk in elderly

• Iris supported IOL option may be considered

• Scleral supported IOLs very popular

• Capsule supported IOLs preferred whenever possible