

A detailed anatomical diagram of a human eye in cross-section, illustrating the process of cataract surgery. A grey surgical instrument, likely a phacoemulsification probe, is shown inserted into the eye through a small incision. The instrument's tip is positioned within the lens, with blue arrows indicating the direction of movement or the process of emulsification. The diagram shows the iris, ciliary muscles, and the vitreous body. The lens is depicted as a textured, brownish structure. The overall scene is set against a light background, with the eye's outer layers and internal structures clearly visible.

# **CATARACT SURGERY**

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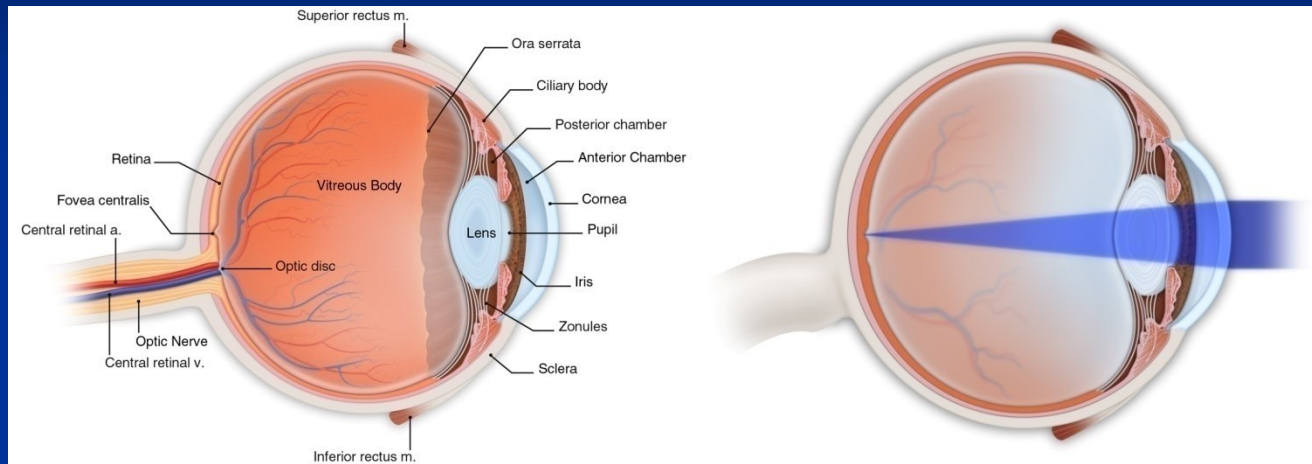
# Cataract Surgery

## Objectives

- to explain what a cataract is
- to describe indications for cataract surgery
- to describe post operative symptoms requiring urgent re-examination
- to describe ICD-9, DRG, and CPT codes in relation to cataracts and cataract surgery

# Cataract Surgery

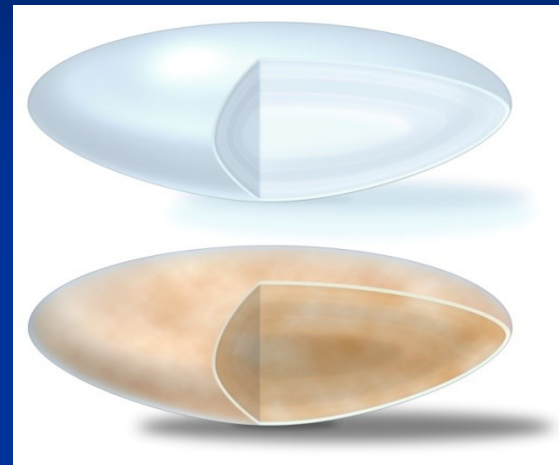
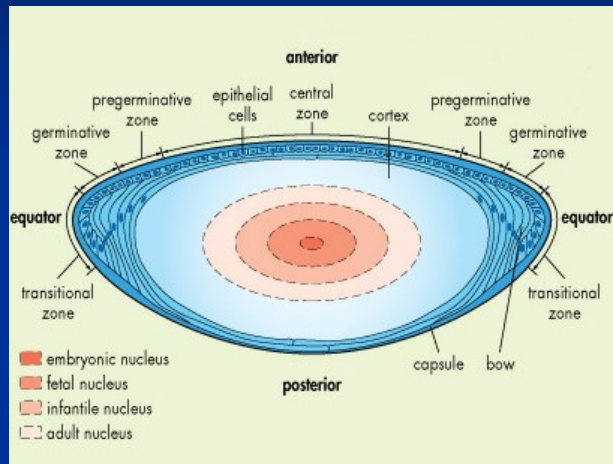
## The Lens and Cataract



- Crystalline lens focuses a clear image on retina
- Suspended behind iris by filamentous zonules
- Flexible and changes shape with contraction of ciliary muscle permitting focusing of image

# Cataract Surgery

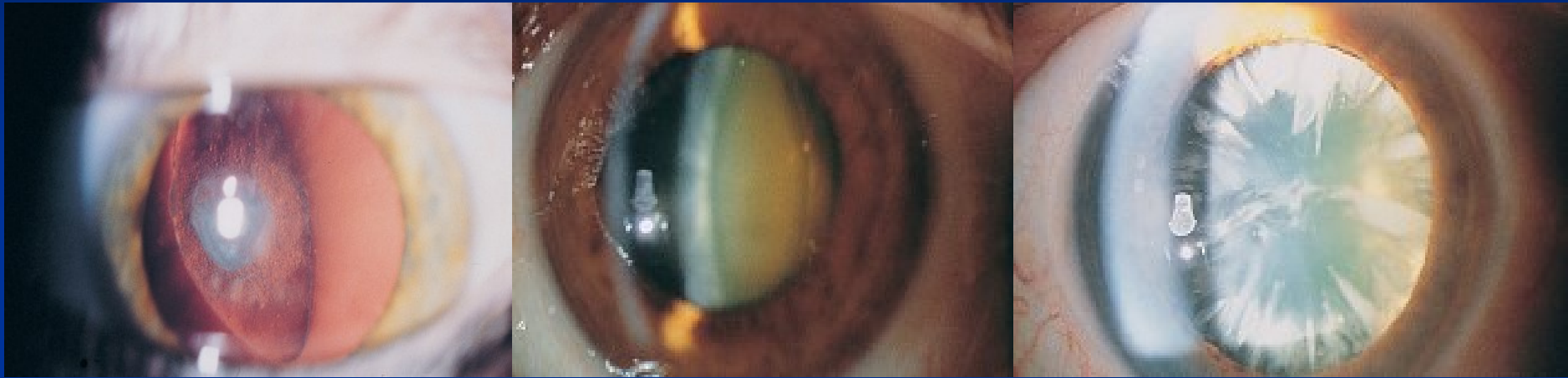
## The Lens and Cataract



- Consists of elastic capsule, cortex and nucleus
- Grows throughout life compressing nucleus
- A cataract is any opacity or discoloration of lens (366)
  - Described in terms of zones of lens involved
  - Described in terms of color change – brunescant
  - Described in terms of development – immature

# Cataract Surgery

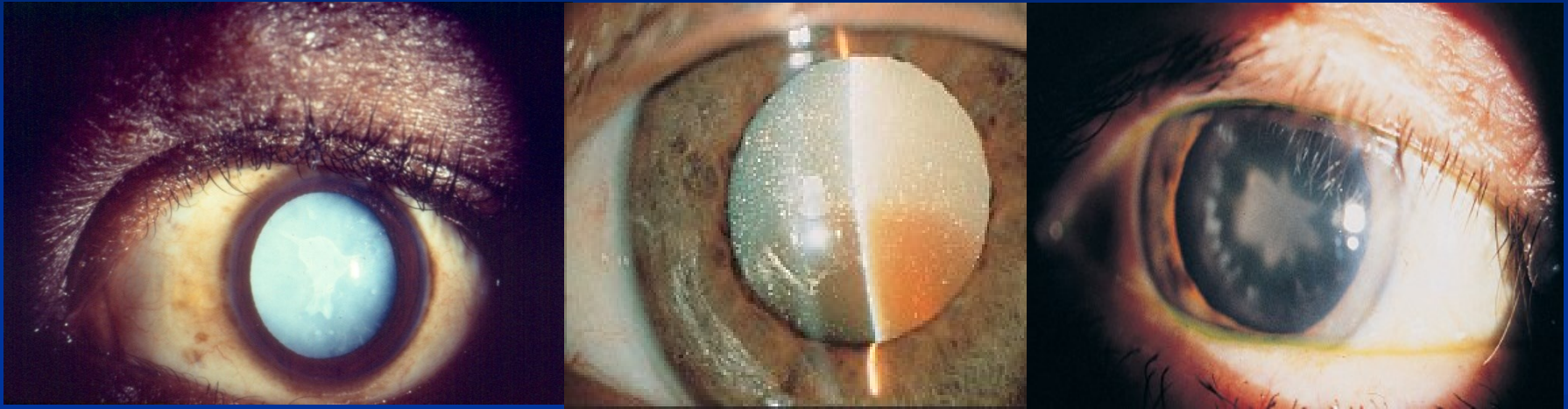
## Lens and Cataract



- A cataract is described in terms of zones of lens involved, colour change, and development
  - Infantile, nuclear cataract (366.04)
  - Senile nuclear sclerosis with brunescens (366.16)
  - Cortical senile cataract (366.15)

# Cataract Surgery

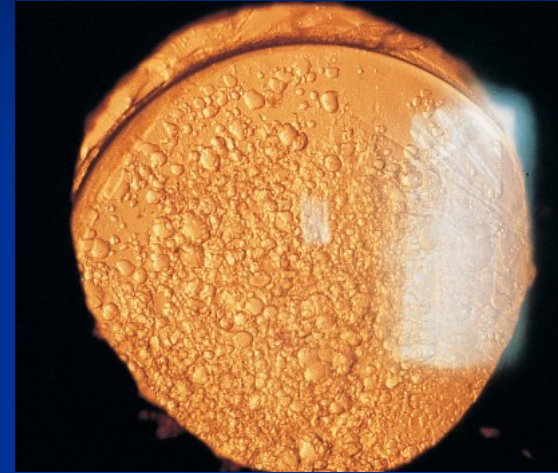
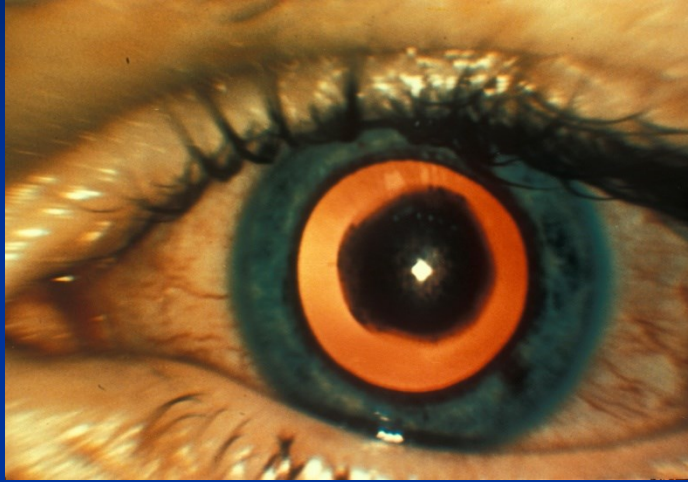
## Lens and Cataract



- A cataract is described in terms of zones of lens involved, colour change, and development
  - Infantile, nuclear cataract (366.04)
  - Senile nuclear sclerosis with brunescens (366.16)
  - Cortical senile cataract (366.15)
  - Total or mature (senile) cataract (366.17)
  - Hypermature (senile) cataract – Morgagni cataract (366.18)
  - Anterior subcapsular traumatic cataract (366.21)

# Cataract Surgery

## Lens and Cataract

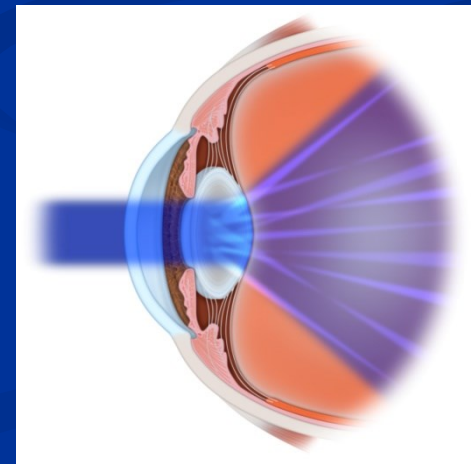


- A cataract may be primary or secondary
  - Primary usually refers to opacification of the lens proper and includes congenital (743.3), infantile (366), senile (366.1), cataract secondary to ocular disorders (366.3), diabetic cataract (366.41), toxic (366.45), etc
  - A secondary cataract usually refers to a so-called after-cataract (366.5) and is really opacification of the posterior capsule following cataract surgery
- Most common cause is age-related
- Other causes include trauma, inflammation, diabetes, corticosteroids

# Cataract Surgery

## Symptoms of Cataract

- Usually very slow onset of symptoms
- Image blur progressing to visual failure
- ‘second sight’ due to increasing myopia
- Double or multiple images
- ‘starbursts’ around lights
- Colour discrimination decreases

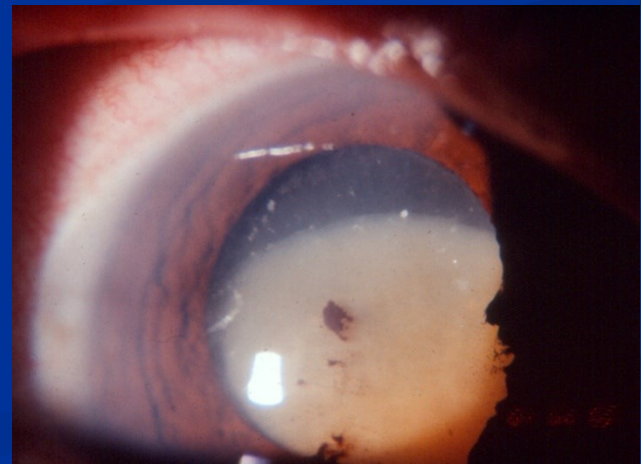




# Cataract Surgery

## Symptoms of Cataract

- Rarely a swelling lens can cause an acute rise in intraocular pressure by closing the anterior chamber angle and/or causing severe inflammation from an immune reaction to leaking lens proteins in the aqueous
- Indicated by sudden onset of pain, redness, and rapid change in vision



# Cataract Surgery

## Pre-operative Ophthalmic Evaluation

- Comprehensive evaluation by operating surgeon
- A-scan biometry for intraocular lens calculation
- Supplemental ophthalmic testing (not routine)
  - Contrast sensitivity
  - Glare testing
  - Potential acuity
  - Specular microscopy
  - Corneal topography
  - B-scan ultrasonography (only if fundus not visible)

# Cataract Surgery

## Pre-operative Medical Evaluation

- Internal medicine evaluation indicated for patients with COPD, recent myocardial infarct, unstable angina, poorly controlled diabetes, poorly controlled hypertension
- Routine medical testing (blood tests, EKG) do not increase the safety of cataract surgery

# Cataract Surgery

## Nonsurgical Management

- Operating ophthalmologist explaining to patient the symptoms of cataract and the risks benefits, and alternative treatments
- Stop smoking
- Refraction and prescribing of glasses when appropriate

# Cataract Surgery

## Indications for Surgery

- Cataract associated visual loss that negatively affects quality of life by limiting ability to drive safely, read, participate in sports, etc.
- Secondary glaucoma or lens induced uveitis
- Cataract inhibits optimal management of posterior segment disease such as diabetic retinopathy

# Cataract Surgery

## Contraindications to Surgery

- The patient does not desire surgery
- Glasses or visual aids provide vision that meets the *patient's needs*
- Surgery will not improve visual function
- The patient's quality of life is not compromised
- The patient cannot safely undergo surgery
- Informed consent cannot be obtained from patient or surrogate
- Appropriate post-operative care cannot be arranged

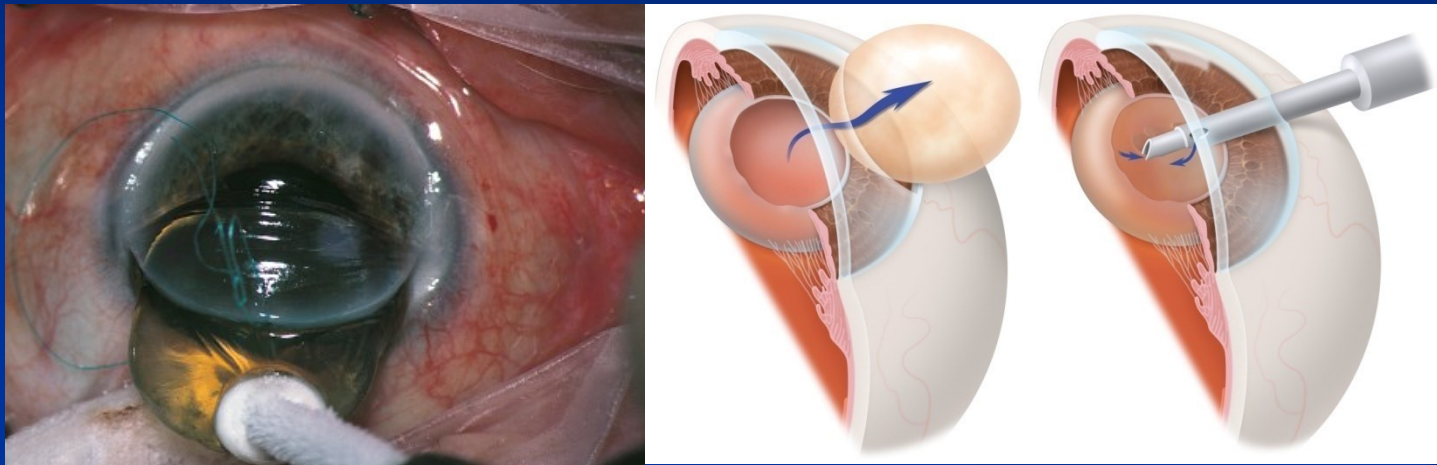
# Cataract Surgery

## Surgical Techniques

- Infection prophylaxis
  - 5% povidine iodine in conjunctival sac prior to surgery
  - Topical broad spectrum antibiotic prior to surgery
- Extracapsular cataract extraction by phacoemulsification preferred method
- Standard extracapsular technique may be required in extremely hard cataracts

# Cataract Surgery

## Surgical technique – Lens removal



Common lens (cataract) removal techniques include:

- Intracapsular (total) extraction (DRG\* 13.19)
- Extracapsular (partial) extraction
  - Nuclear delivery (DRG 13.59)
  - Phacosection (DRG 13.42)
  - Phacoemulsification (DRG 13.41)

\* DRG = Diagnosis Related Groupings

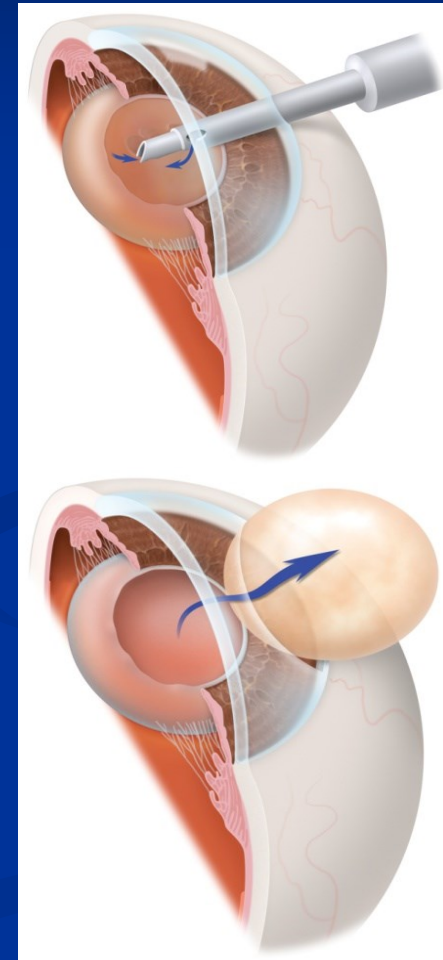


# Cataract Surgery

## Surgical technique – Technical Elements

Successful cataract procedures include:

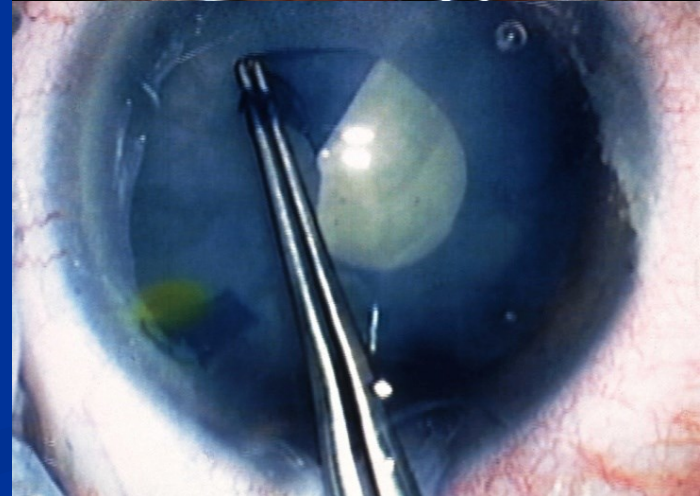
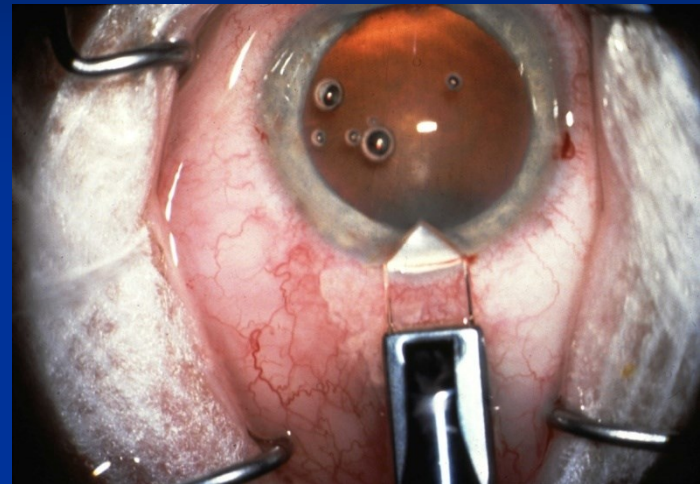
- Capsular fixation of a posterior chamber IOL (DRG 13.71)
- Little or no trauma to corneal endothelium, iris and other ocular tissues
- Incision design that minimizes surgically induced astigmatism
- Watertight closure of the incision, self-sealing or sutured



# Cataract Surgery

## Intraocular Steps of Phacoemulsification

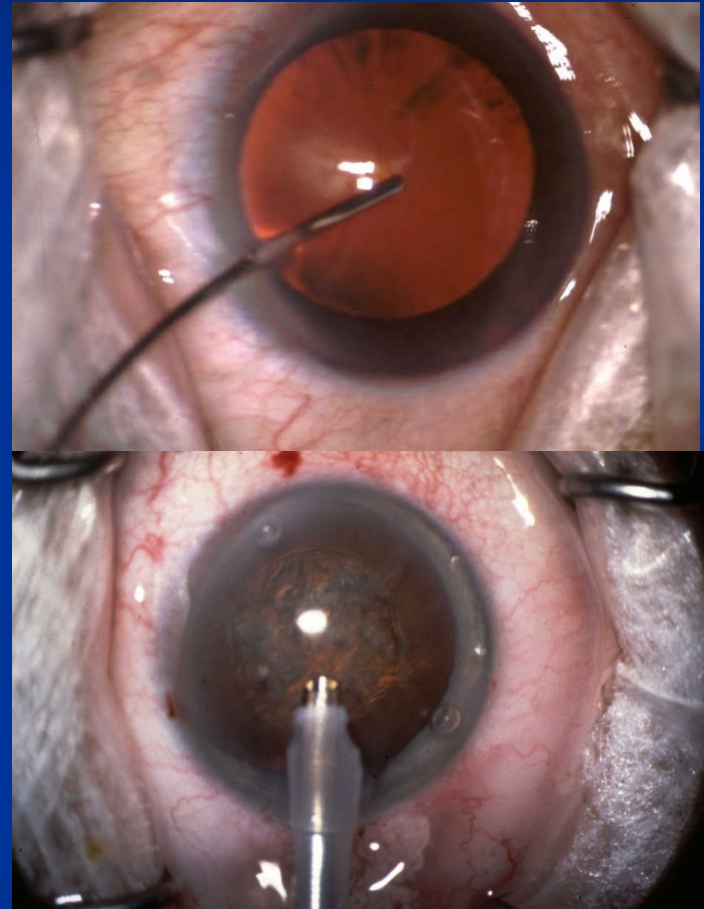
- Self-sealing incision
  - shelving
  - 1 – 3 mm
- Paracentesis incisions (2)
- Staining of anterior capsule
- Capsulorhexis
  - Opening of anterior capsule



# Cataract Surgery

## Intraocular Steps of Phacoemulsification

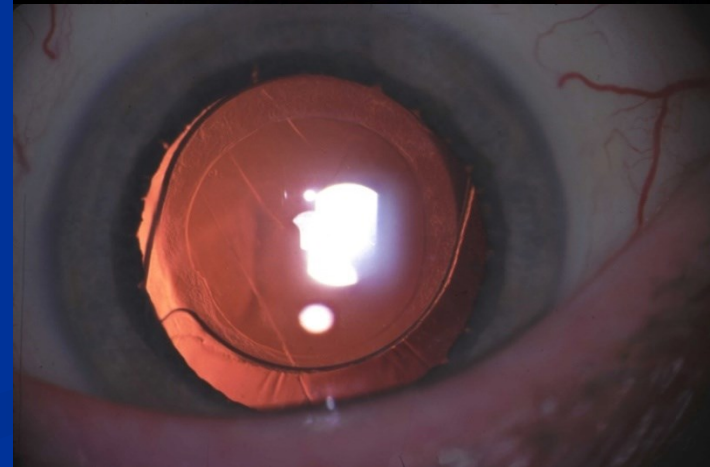
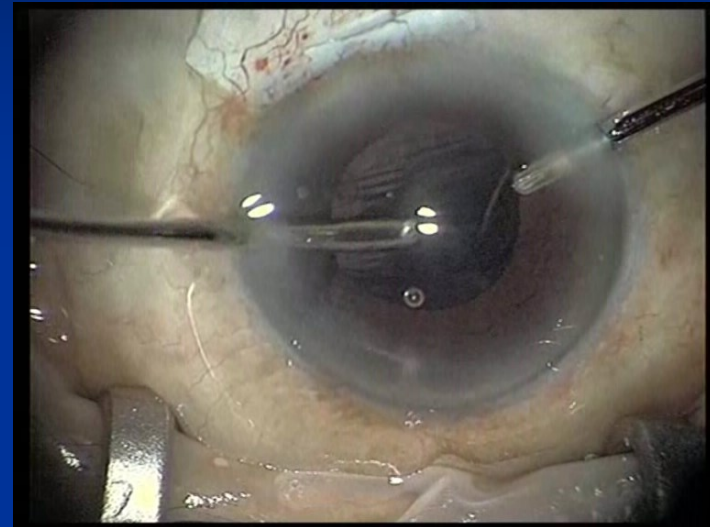
- Hydrodissection
  - Separation of nucleus from cortex by jet of water
- Nuclear disassembly
  - Loosened nucleus quartered and/or chopped, liquified and aspirated



# Cataract Surgery

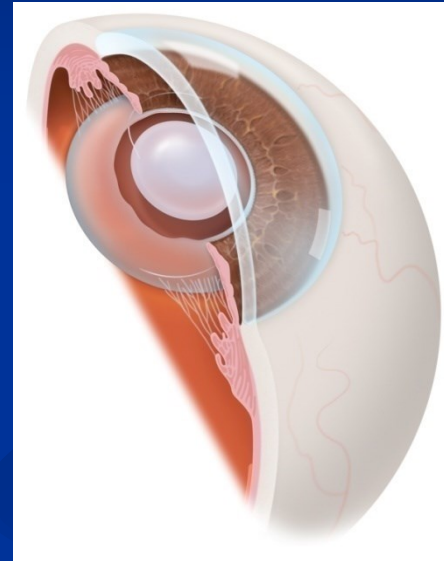
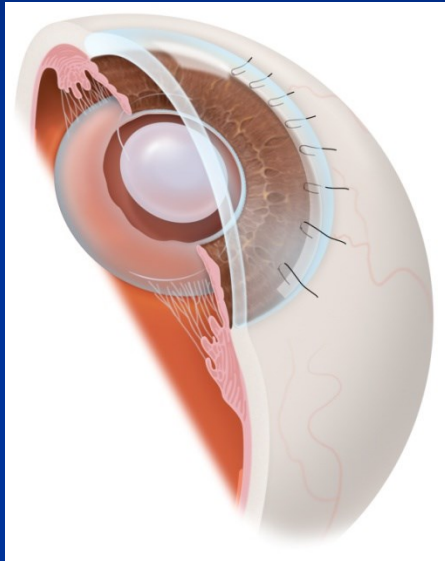
## Intraocular Steps of Phacoemulsification

- Complete removal of epinucleus and cortex
- Implantation of centered IOL



# Cataract Surgery

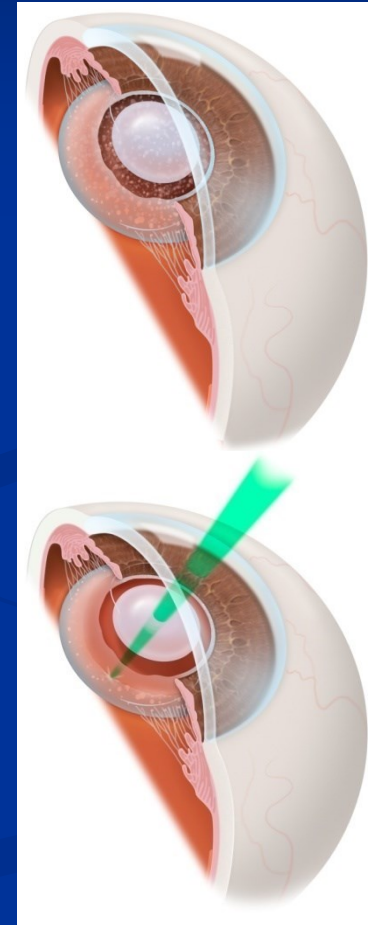
## Intraocular Steps of Phacoemulsification



- Watertight closure of wound

# Cataract Surgery Complications

- Dropped nucleus 1% (15% residents)
- Infectious endophthalmitis 0.13% (0.06-0.17%)
- Expulsive choroidal hemorrhage 0.3% (0.1-0.5%)
- Cystoid macular edema 1.4% (1.2-1.6%)
- Retinal detachment 0.7% (0.6-0.8%)
- Corneal edema 0.3% (0.2-0.4%)
- Dislocated IOL
- Posterior capsule opacification 19.7% (19.1-20.3)



# Cataract Surgery

## Outcomes

- Cataract surgery is highly successful
- Post-operative visual acuity reached 20/40 or better in 90% of all cases of cataract surgery and in 95% of cases without pre-surgical co-morbidity

# Cataract Surgery

## Postoperative Care

- Responsibility of operating ophthalmologist
- Operating ophthalmologist obliged to inform patient about:
  - signs and symptoms of possible complications
  - eye protection
  - activities
  - medications
  - required visits
  - how to access emergency care



# Cataract Surgery

## Symptoms Requiring Prompt Attention

- Decreasing vision
- Increasing pain
- Progressive redness
- Periorbital swelling
- Discharge from the eye (not tears!)
- New floaters
- Photopsias (light flashes)
- Field defects

