

CATARACT

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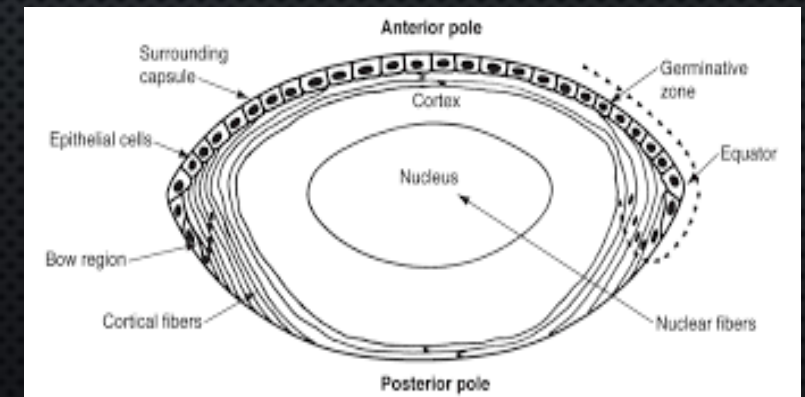
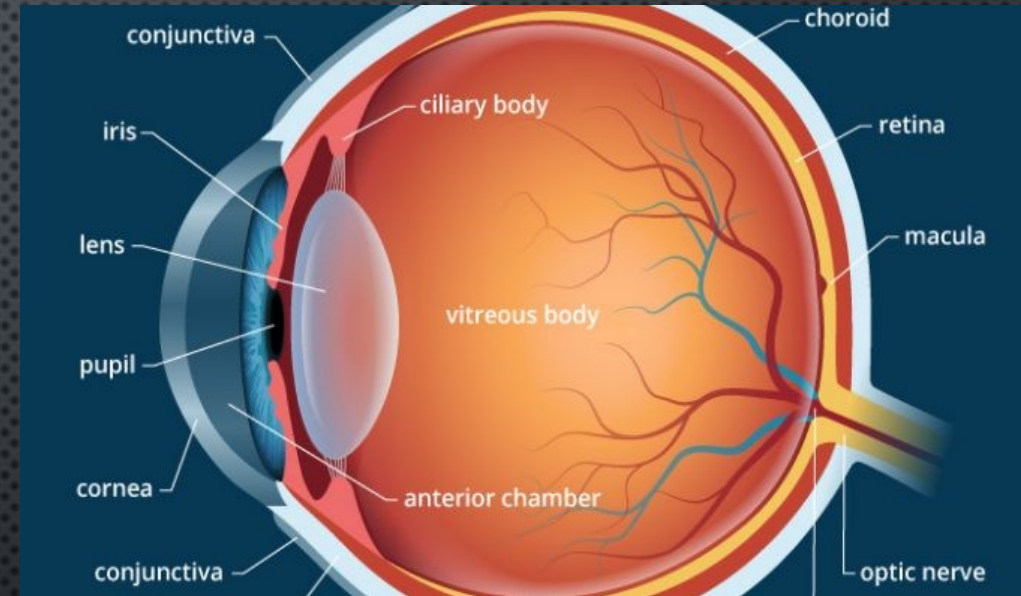
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LENS

- one of two main refractive structure (the other is cornea)
- optical power around 10-20 D - depending on individual accommodation
- biconvex shape
- thickness 4 mm
- diameter 12mm
- optically transparent structure
- metabolism changes - water decreases with the age



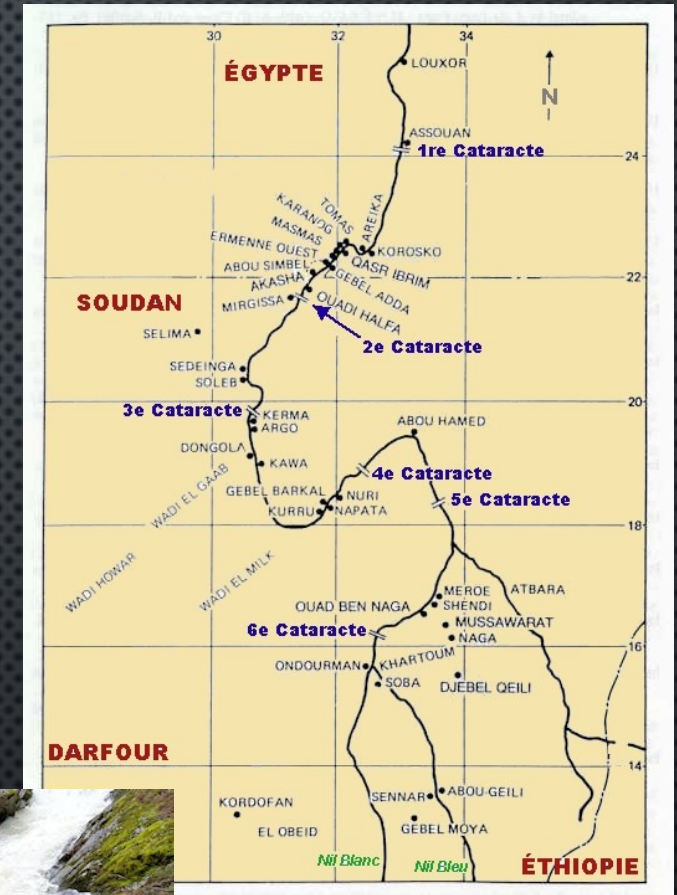
Cataract

Clinical signs

- reduced transparency of the lens
- decrease of visual acuity, blurred vision
- decrease of contrast sensitivity, shades of gray
- glare, monocular diplopia

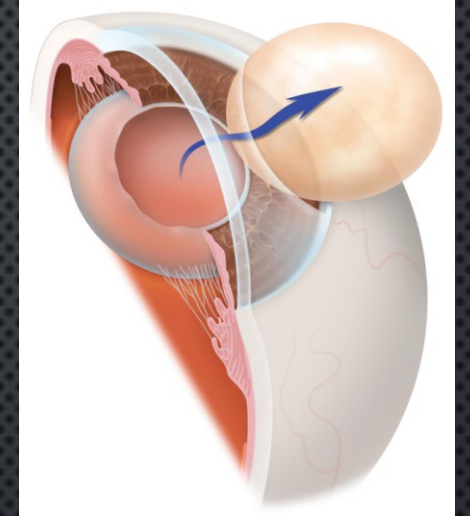
„cataract“

- cataract = *waterfall*
- (greek) „καταρράκτης“



History

- *Jacques Daviel* (1696-1762) – limbal incision, lens extraction
- **Extracapsular extraction** (ECCE)- opening of anterior capsule, removal of cortex and nucleus of the lens
- **Intracapsular extraction** (ICCE)- entire lens is frozen and removed from the eye
- *Charles Kelman*, 1967 – **phacoemulsification** – revolution in cataract surgery



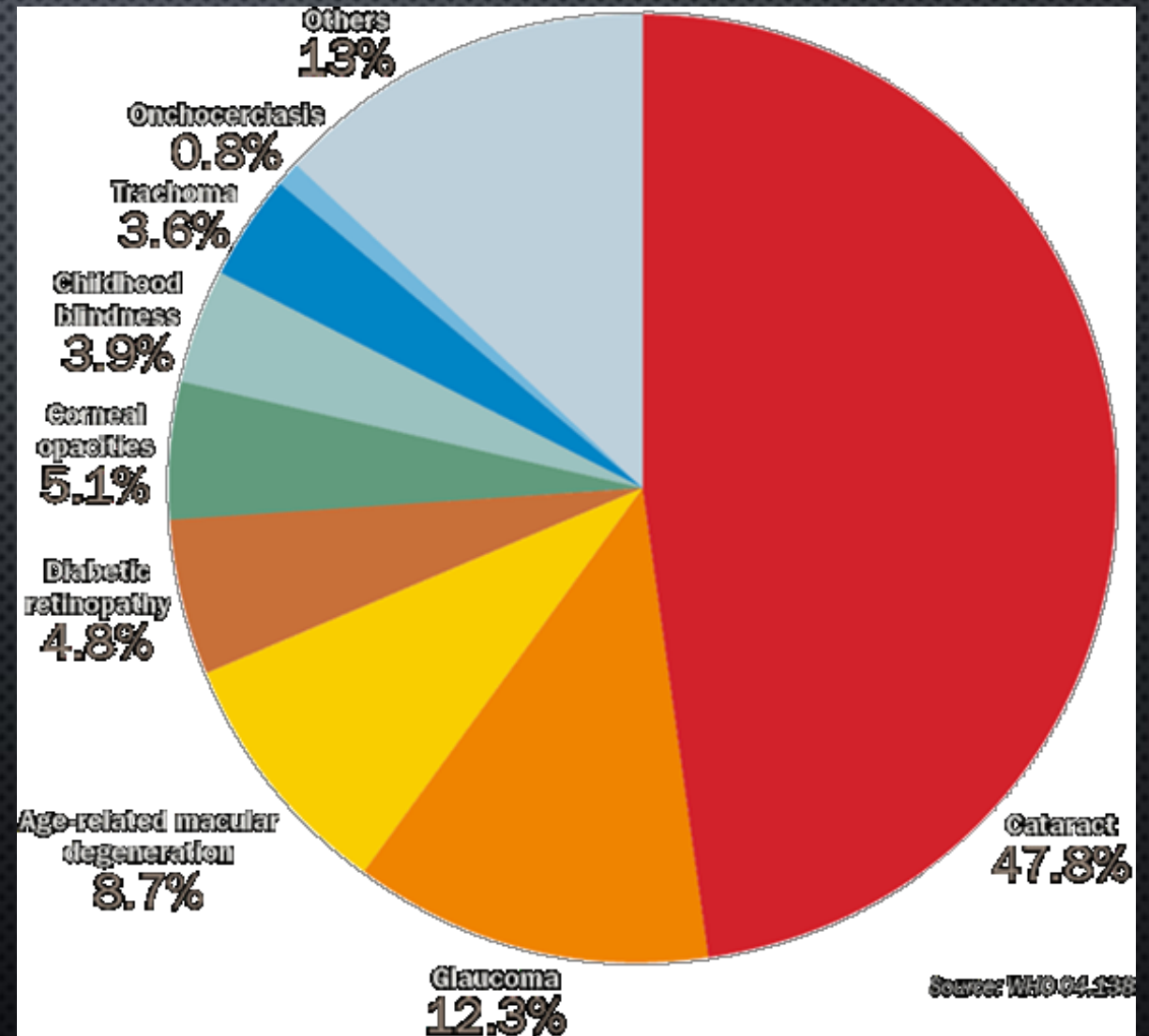
Epidemiology

World

- 30-45 millions of blindness worldwide
 - 45% of all caes - cataract

Prevalency

- increase by age
- Age 65-74 – 50%
- Age >75 – 70%



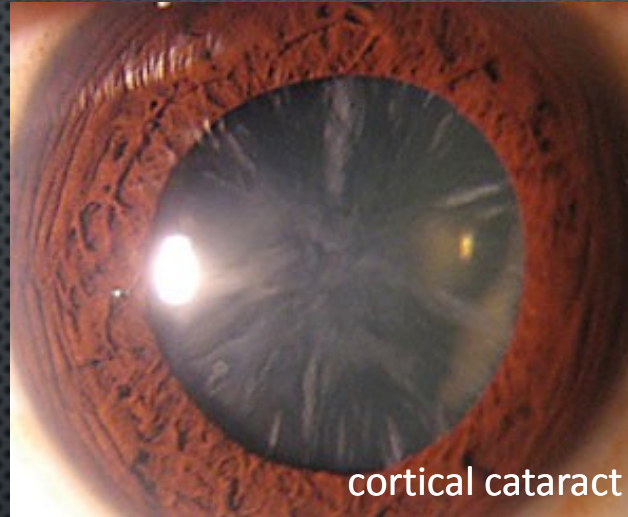
Classification of cataract

1. Acquired

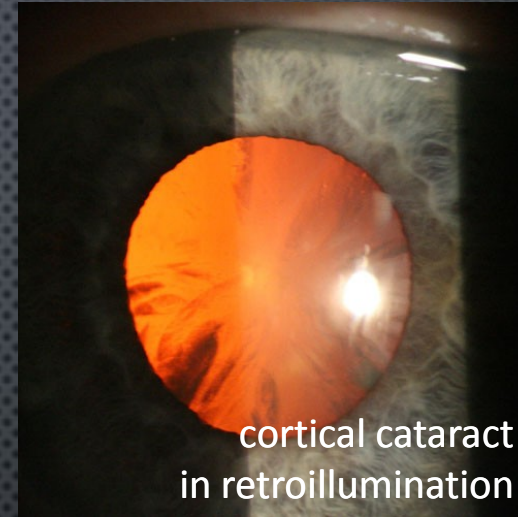
Senile – 90%

Systemic disease

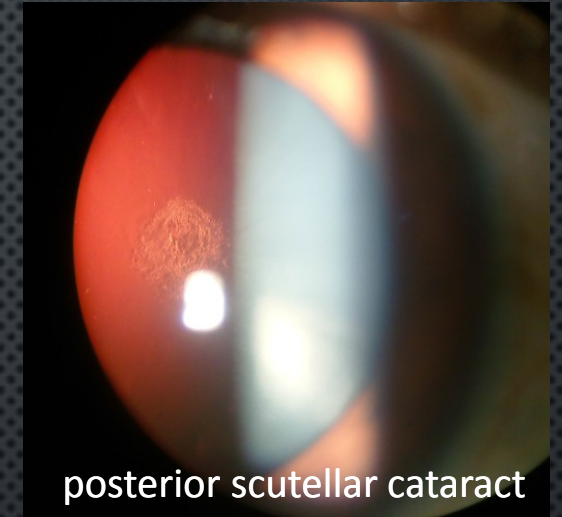
DM, galactosemia, Fabry disease,
Wilson disease, chronic
iritis, postsurgical,
traumatic, toxic, drug induced



cortical cataract



cortical cataract
in retroillumination

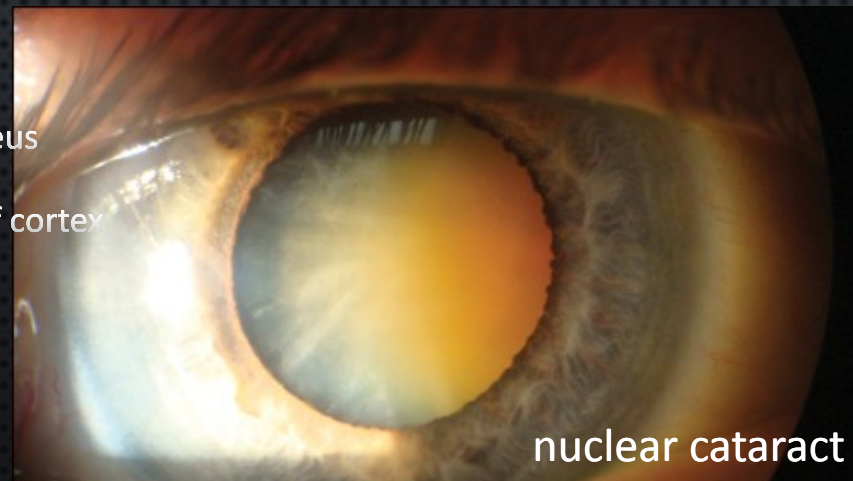


posterior subcapsular cataract

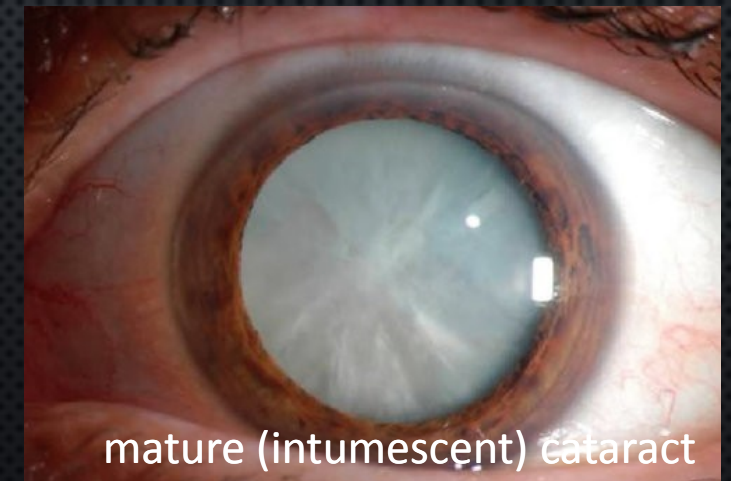
2. Congenital – lamellar, zonular, coronary, cerulean

Type

- Nuclear - tend to be myopic, color of nucleus
- Cortical - tend to be hyperopic, changes of cortex
- Anterior subcapsular
- Posterior subcapsular
- Mature, hypermature



nuclear cataract



mature (intumescent) cataract

Examination before cataract surgery

Medical history

- diabetes, hypertension
- cardiac conditions
- medication
- allergy

Ocular history

- ocular disorders
- strabismus
- amblyopia
- glaucoma
- operation
- refractive surgery

Examination

Anterior part

- position of eyelids
- tear film
- conjunctiva
- cornea
- anterior chamber
- iris
- pupil
- lens

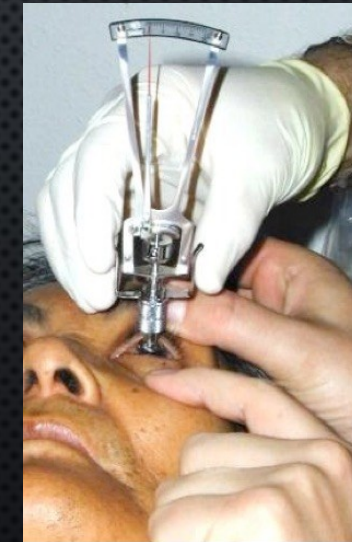
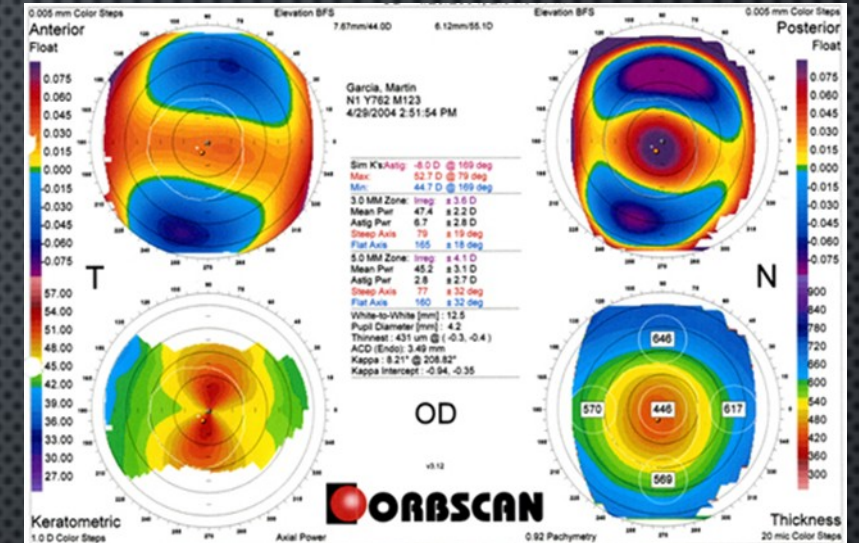
Posterior part

- vitreoretinal interface
- retina (including periphery)



Examination

- intraocular pressure
- UCVA, BCVA
- biometry, keratometry
- corneal topography
- ultrasound, OCT (optical coherence tomography)
- postoperative refractive status
- type of IOL



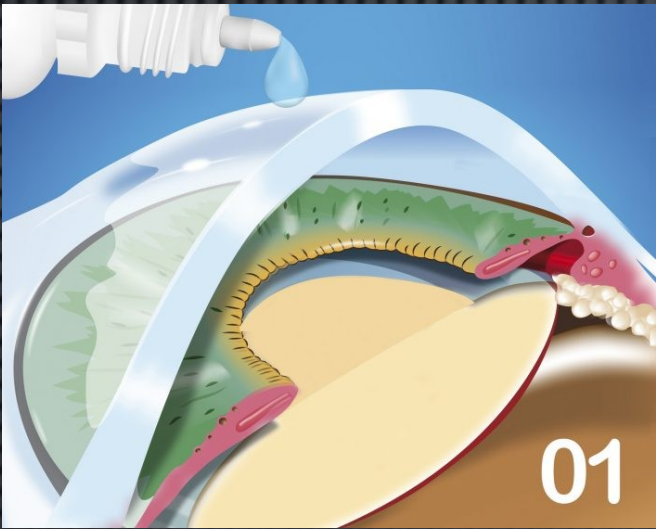
Treatment of cataracts

Surgical

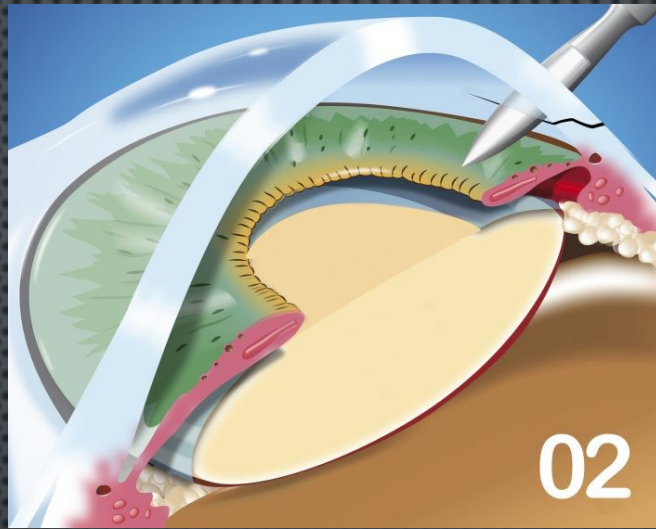
- **microsurgical technique using microscope**
- **topical anesthesia, general anesthesia**

Cataract surgery step-by-step

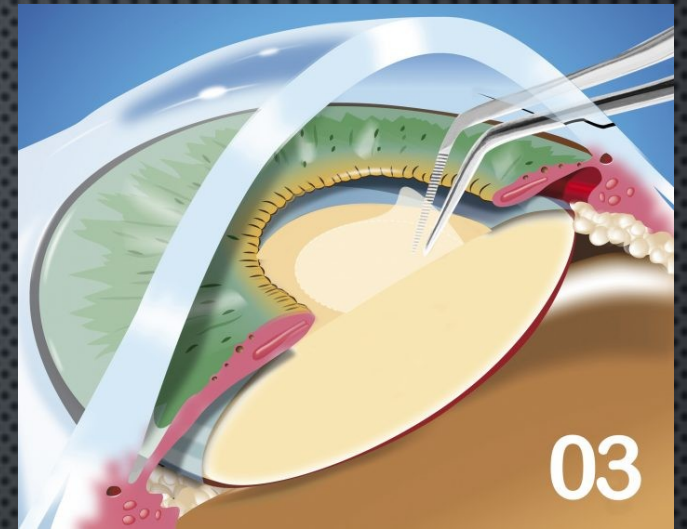
- 1) disinfection
- 2) topical anesthesia (oxybuprocaine, lidocaine, tetracaine)
- 3) **corneal incision** (1,8-2,2mm)
- 4) viscoelastic material
- 5) capsulotomy
- 6) hydrodissection, hydrodelineation
- 7) **phacoemulsification**
- 8) **implantation** of IOL
- 9) viscoelastic material removal



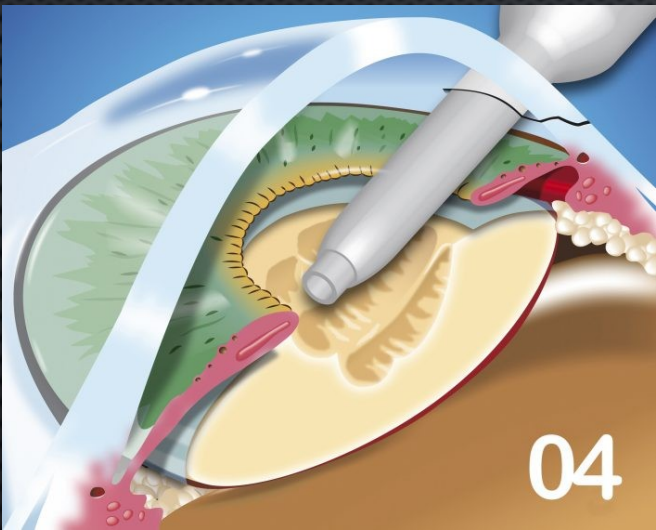
Topical anesthesia



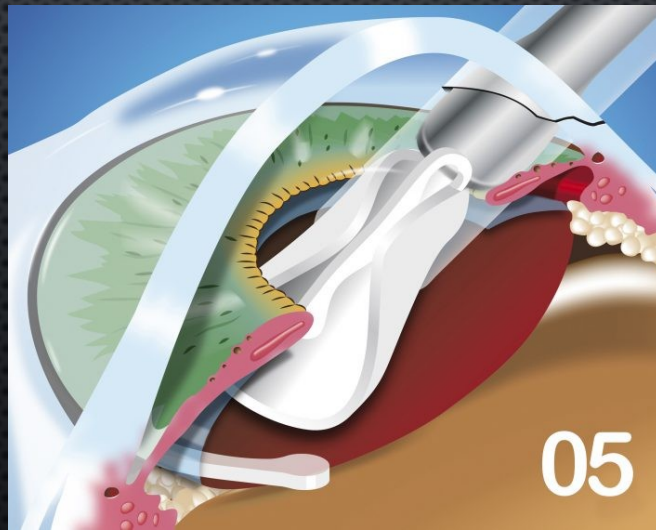
Incision (corneal tunnel)



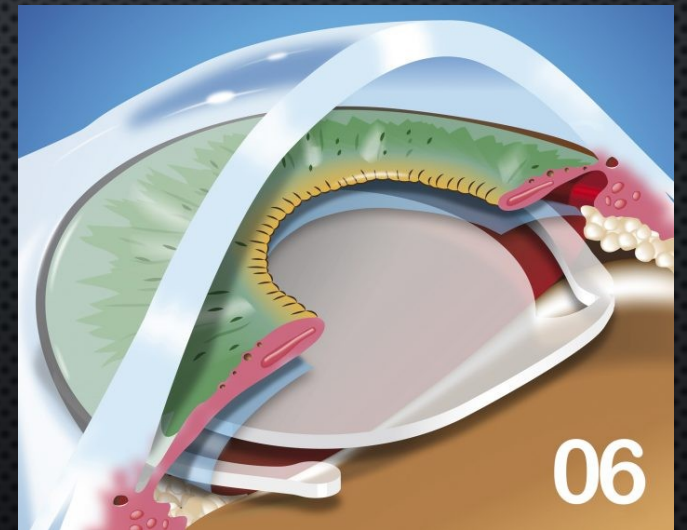
Capsulorhexis



Phacoemulsification

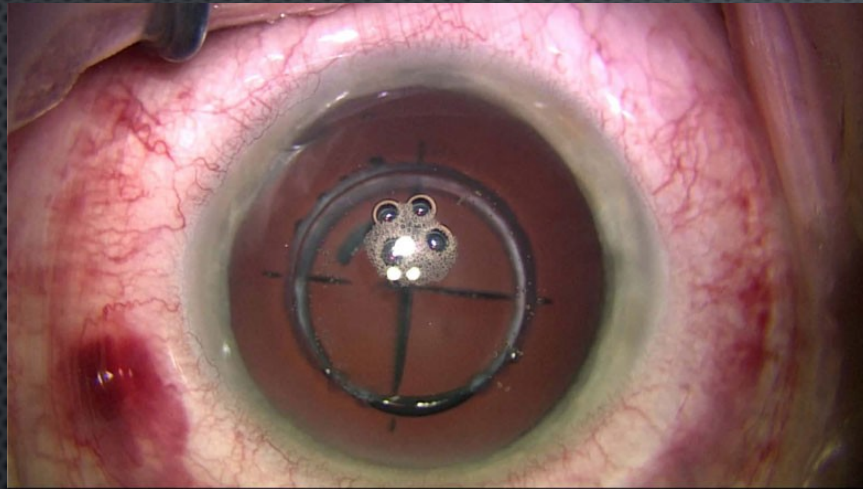


Implantation of IOL



finalisation

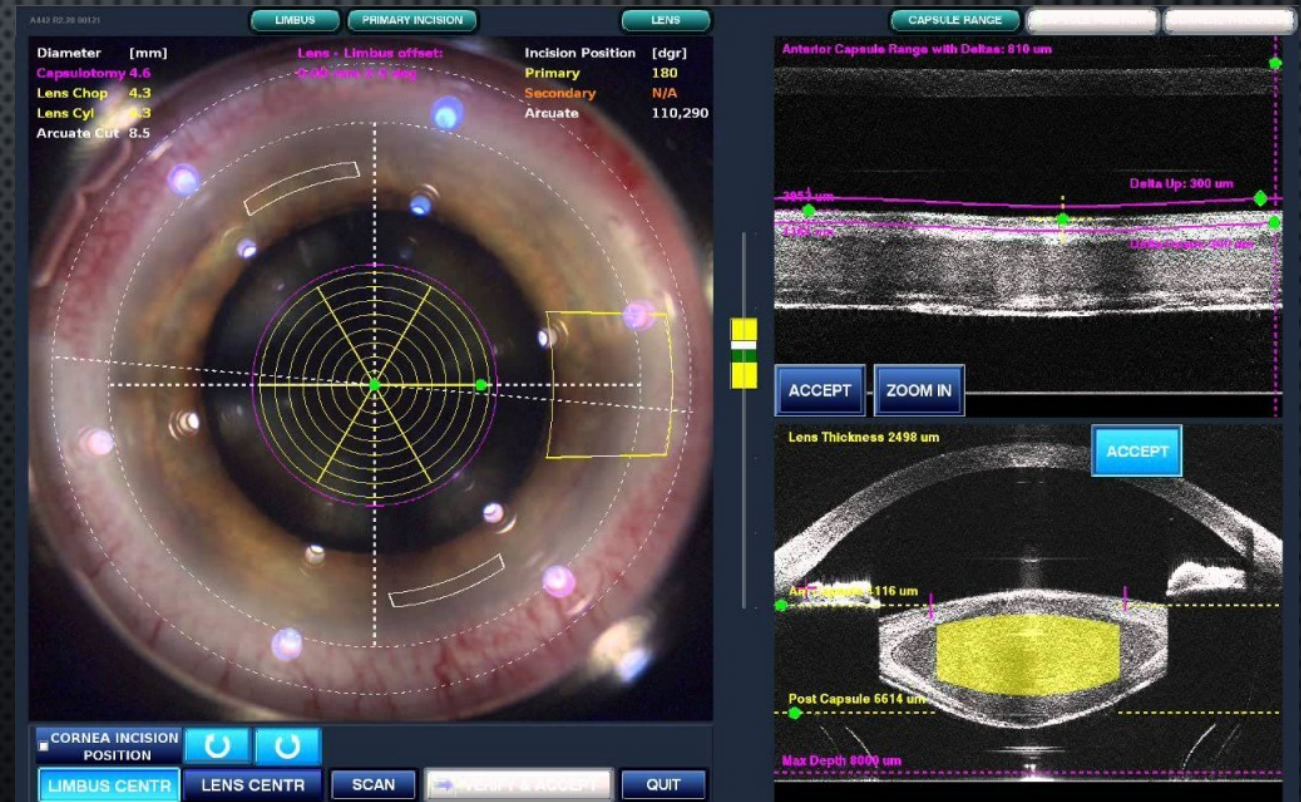
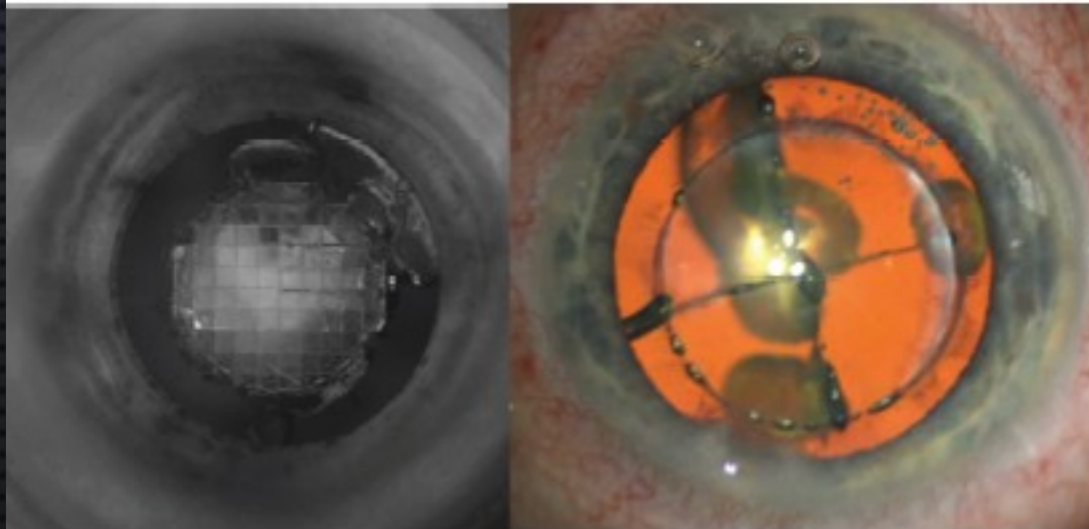
Femtosecond laser-assisted cataract surgery



- incision, capsulotomy and lens fragmentation using femtosecond laser
- phacoemulsification still necessary

Softening for a hard cataract

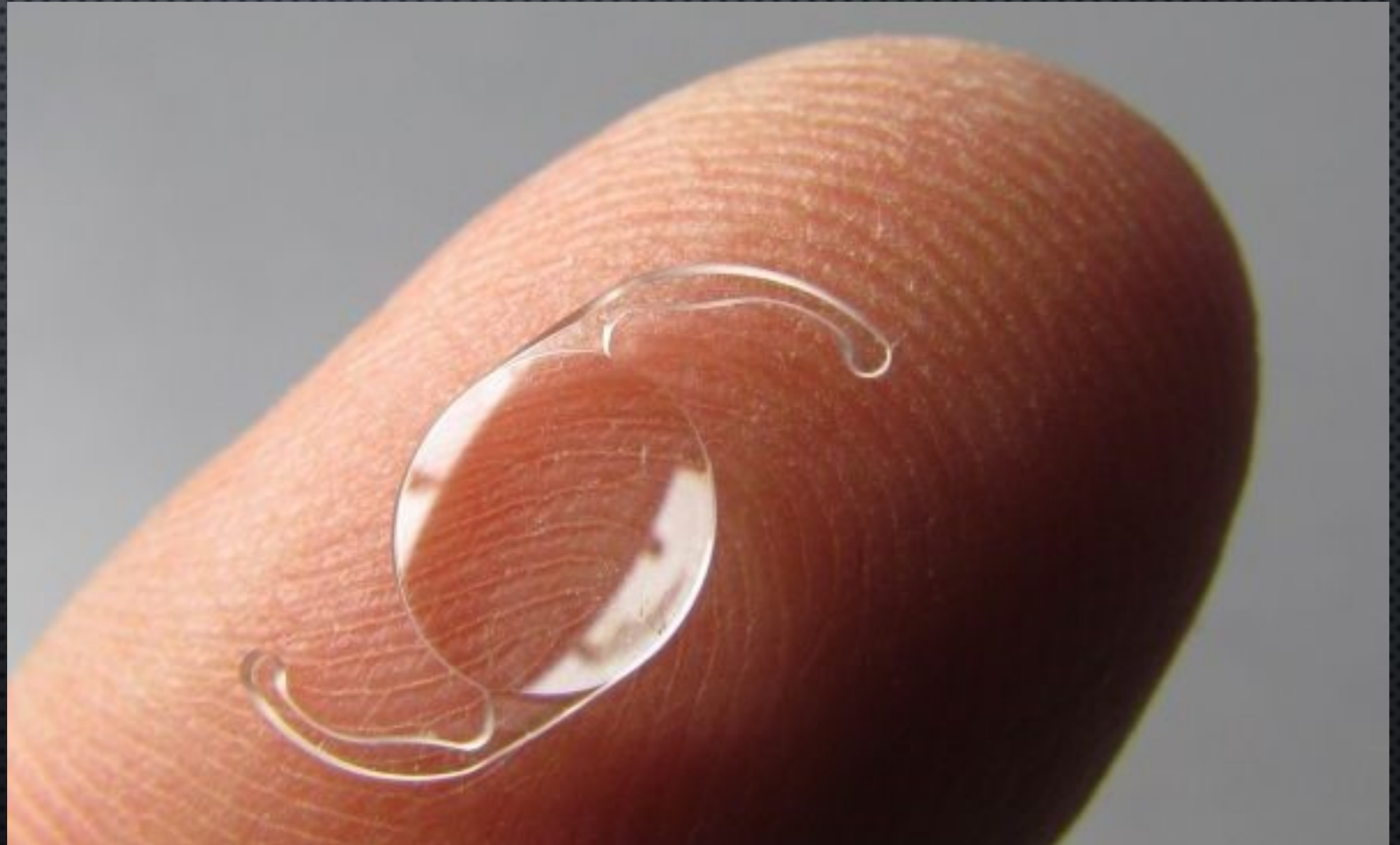
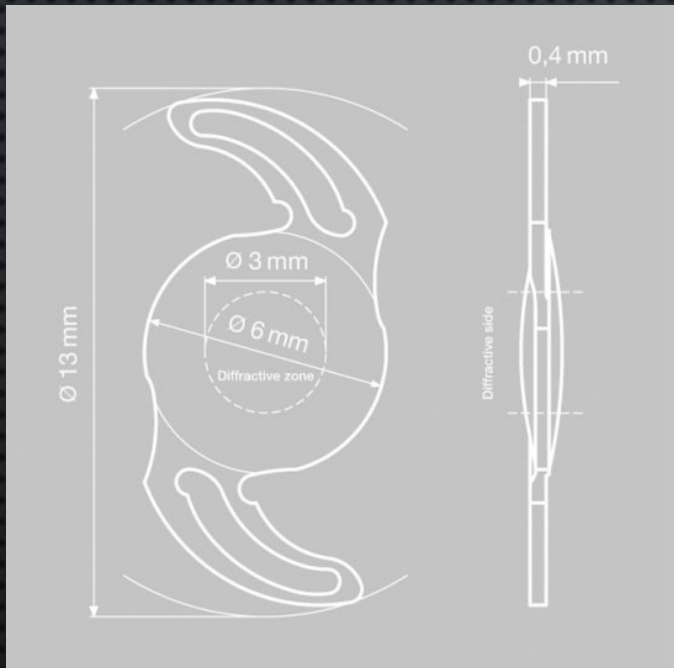
Segmentation for a soft cataract



INTRAOCULAR LENS

Design of IOL

- Optical part 6mm
- haptic 13mm



Types of IOL

Types of IOL

- monofocal / monofocal toric
- multifocal / multifocal toric
 - bifocal
 - trifocal

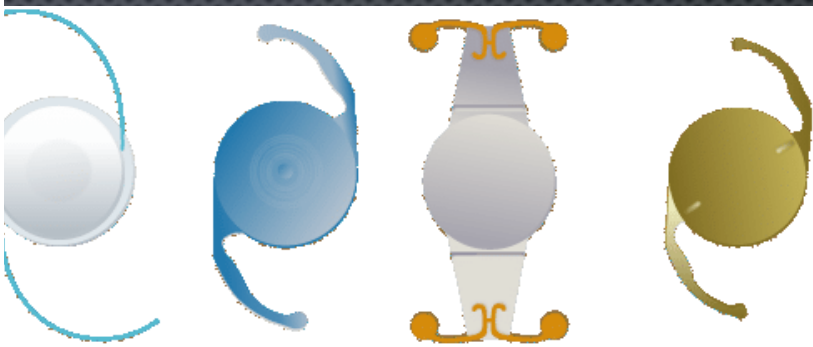
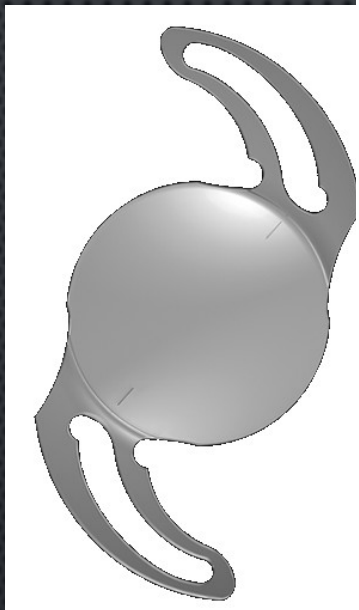
Material

- „Hard“ (PMMA)
- Soft (acrylate)
 - hydrophobic
 - hydrophilic (HEMA)

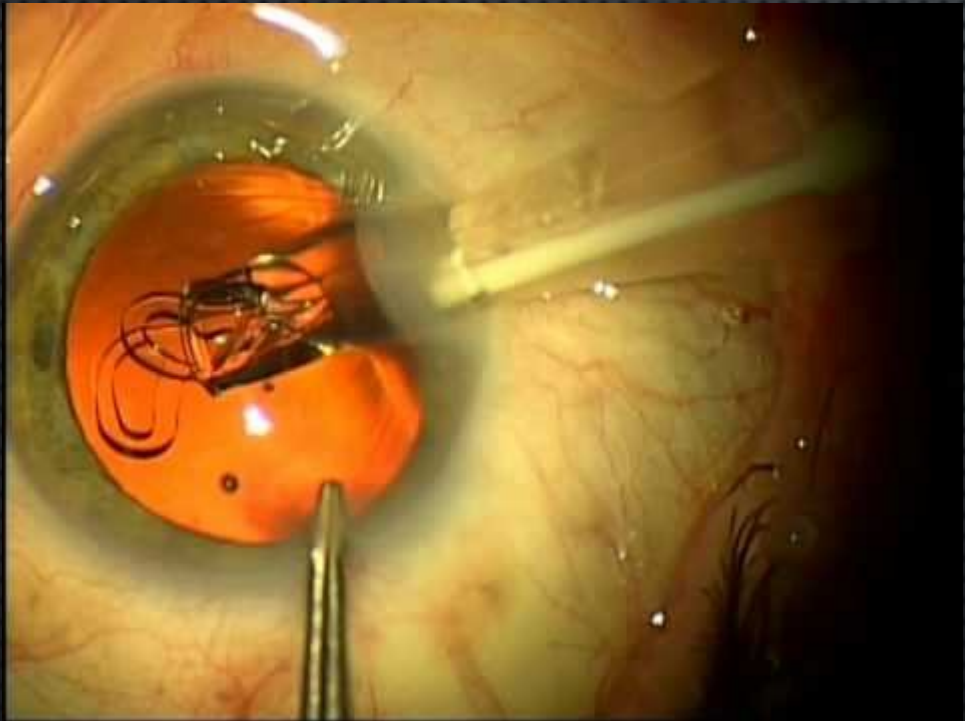
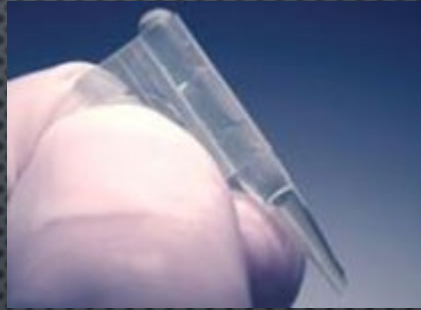
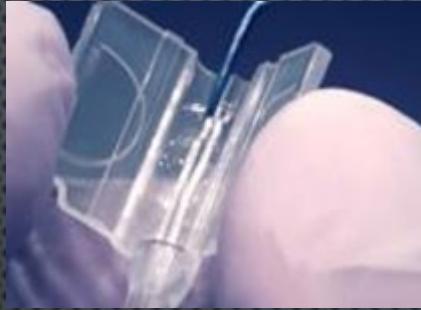
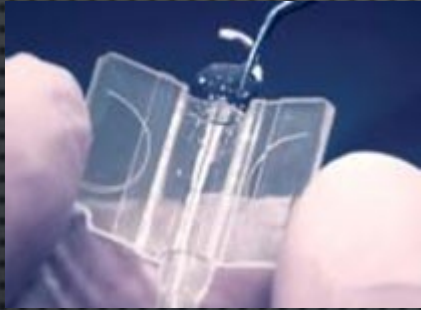
Design

- One piece
- three pieces

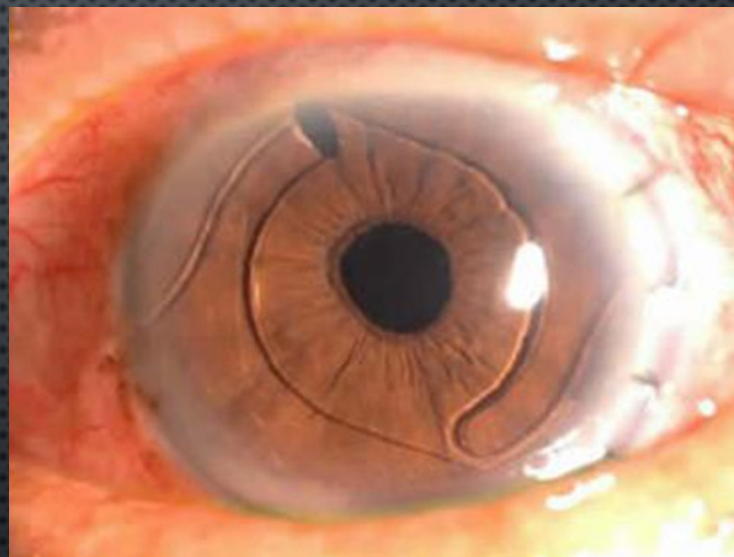
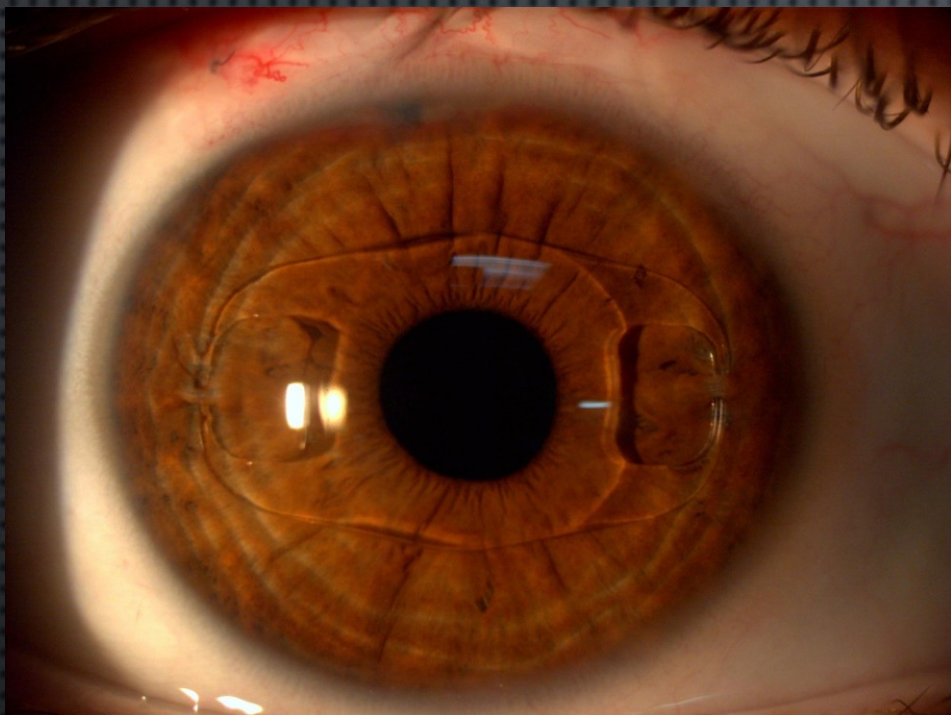
Various design of IOL



Implantation of IOL



Anterior chamber IOL



Intraoperative Complications

Rupture of the posterior capsule

- posterior migration of lens material; therapy: removal of all fragment of the lens, anterior vitrectomy, PPV

IFIS (intraoperative floppy iris syndrome)

- atonic iris after chronic treatment with tamsulosine (benign prostatic hyperplasia)

Suprachoroidal haemorrhage

- bleeding into the suprachoroidal space, shallowing of anterior chamber; increase of intraocular pressure, vitreous extrusion, treatment - closure of the incision; rare complication after small incision cataract surgery

Postoperative Complications

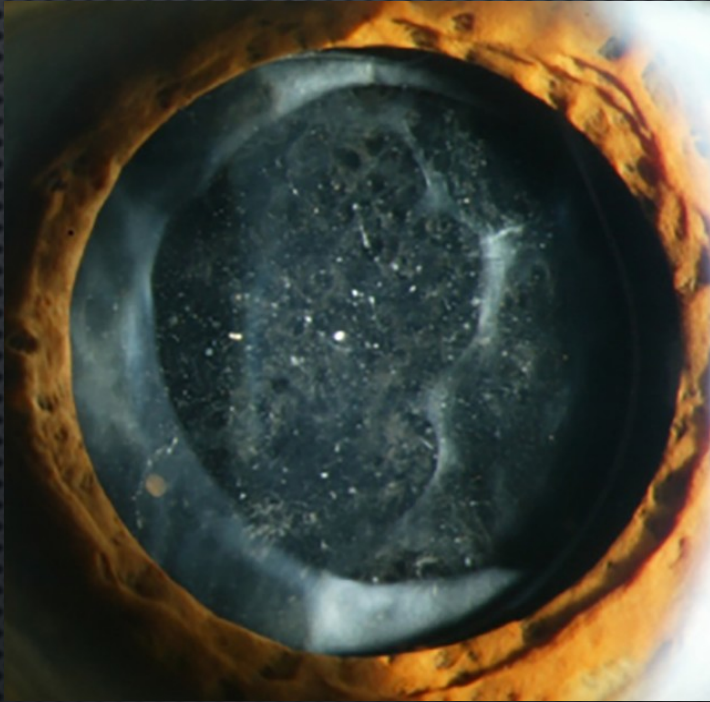
Early

- **TASS** (toxic anterior shock syndrome) - elevation IOP, hypopyon, 24 hours after operation)
- **Endophthalmitis** – 2 to 5 days after operation (pain, hypopyon, decrease of visual acuity)
- **Secondary glaucoma** – elevation of intraocular pressure
- **Macular oedema** – mostly in patients with diabetes

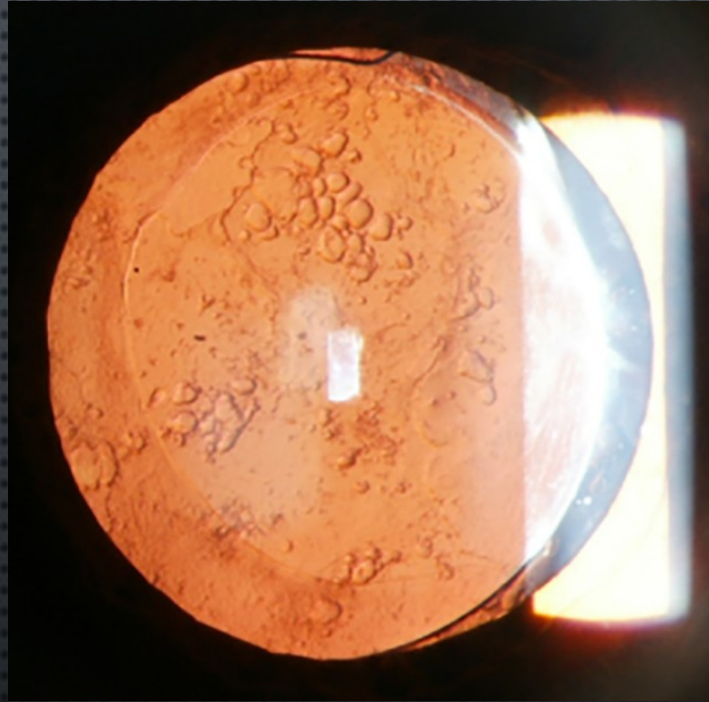
Late

- **Retinal detachment**
- **Posterior capsule opacification – pearls, fibrosis**
- **Lens dislocation**

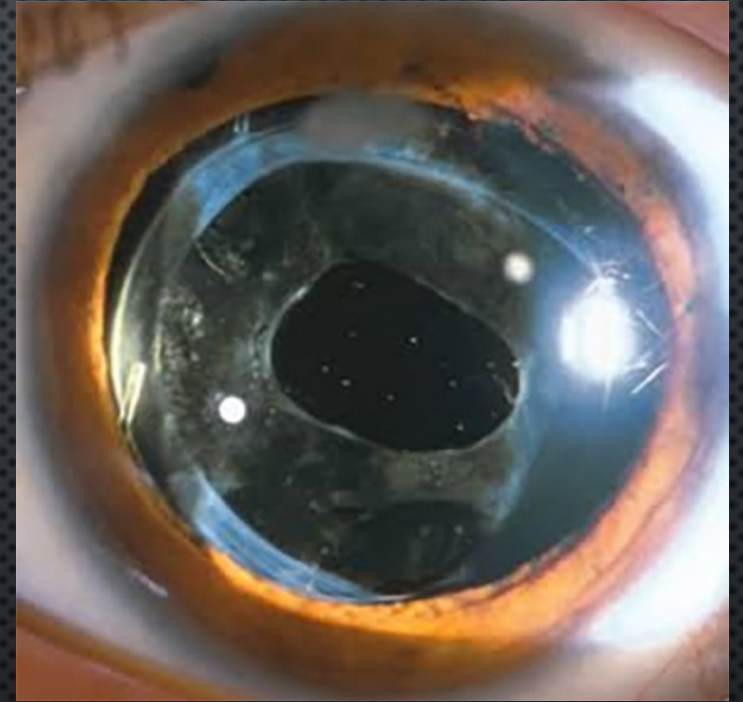
Secondary cataract



Secondary cataract
in mydriasis



Secondary cataract
in retroillumination



Secondary cataract with
window after YAG capsulotomy



THANK YOU FOR YOUR ATTENTION!