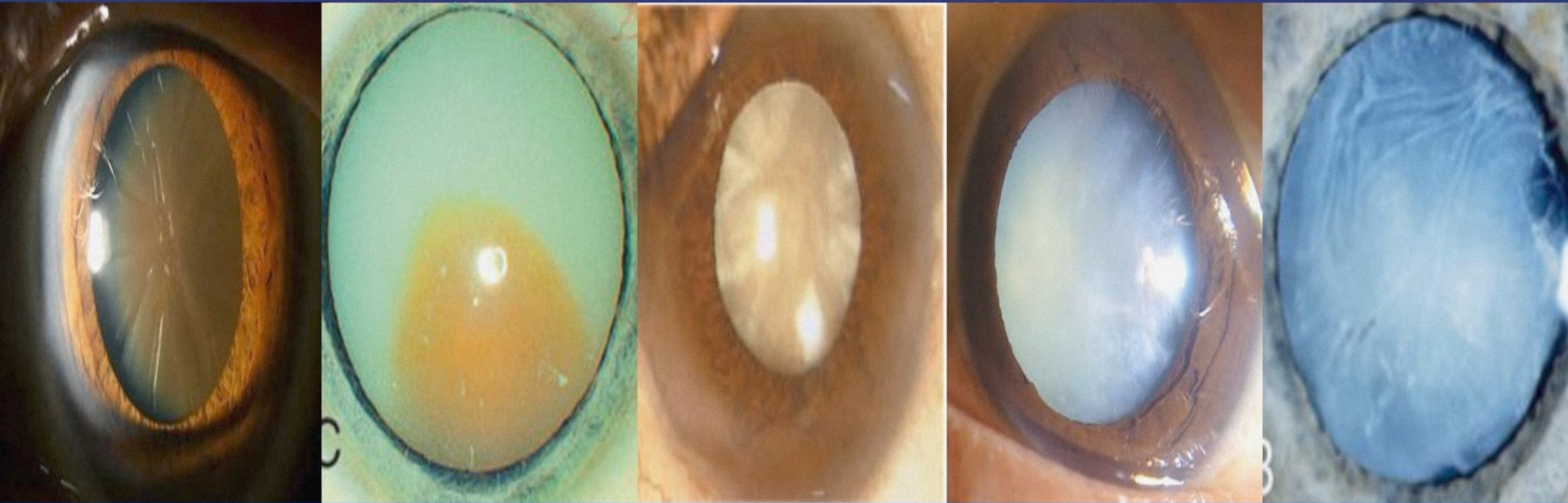


#1 AGE RELATED / SENILE CATARACT

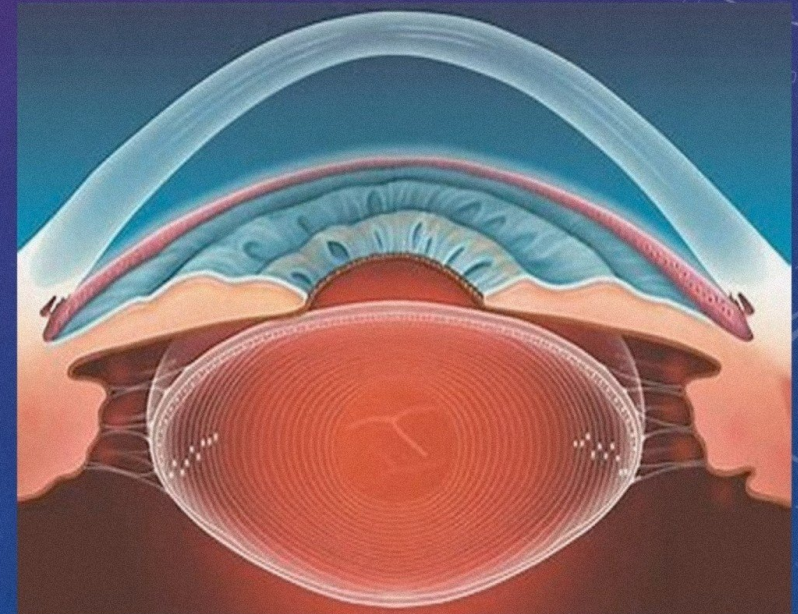


CLASSIFICATION OF THE CATARACT



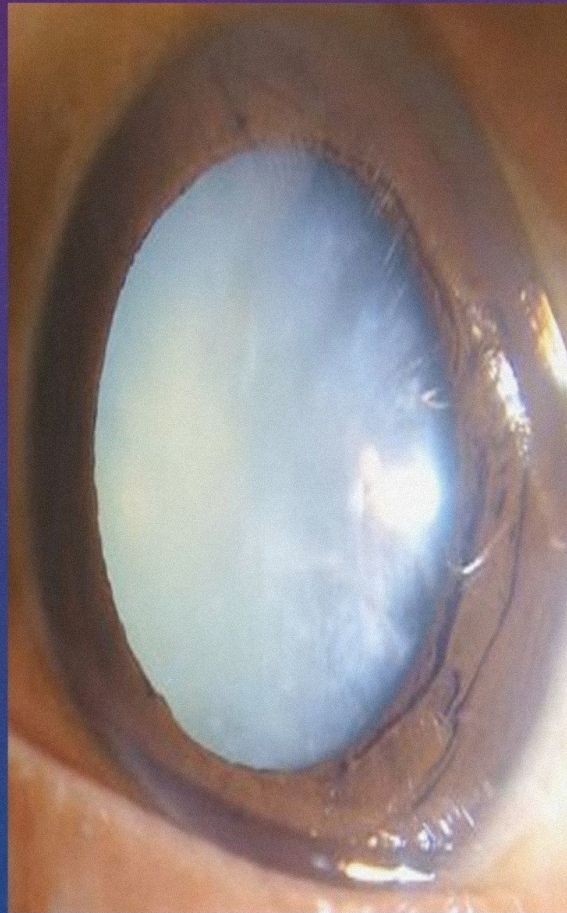
WHAT IS CATARACT ?

- The transparency of the lens is maintained by the **regular arrangement** of the lens fibres which are **devoid of organelles**.
- The main function of the lens is to help in focusing light on the retina
- Any factor that increases the absorption or scattering of light by the lens reduces its transparency.



WHAT IS CATARACT ?

- Derived from the Greek word for waterfall, the term cataract probably refers to the white appearance of some senile cataracts that was likened to rapidly flowing “white water.”



CLASSIFICATION OF THE CATARACT

**ETIOLOGICAL
CLASIFICATION**

**MORPHOLOGICAL
CLASSIFICATION**



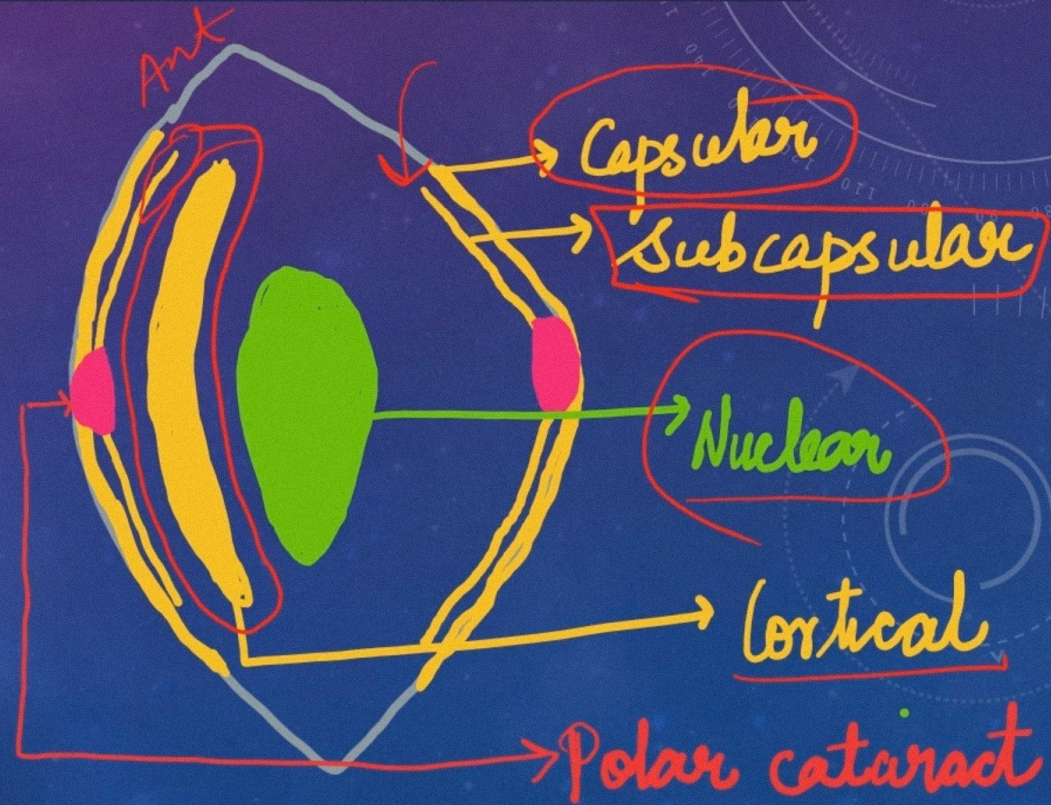
ETIOLOGICAL CLASSIFICATION

- **CONGENITAL and DEVELOPMENTAL CATARACT** → due to disturbance in normal lens development i.e formation of the lens fibres .
- **ACQUIRED CATARACTS** → due to degeneration of the already formed lens fibres .



MORPHOLOGICAL CLASSIFICATION

- CAPSULAR CATARACT
- SUBCAPSULAR CATARACT
- CORTICAL CATARACT
- NUCLEAR CATARACT
- POLAR CATARACT



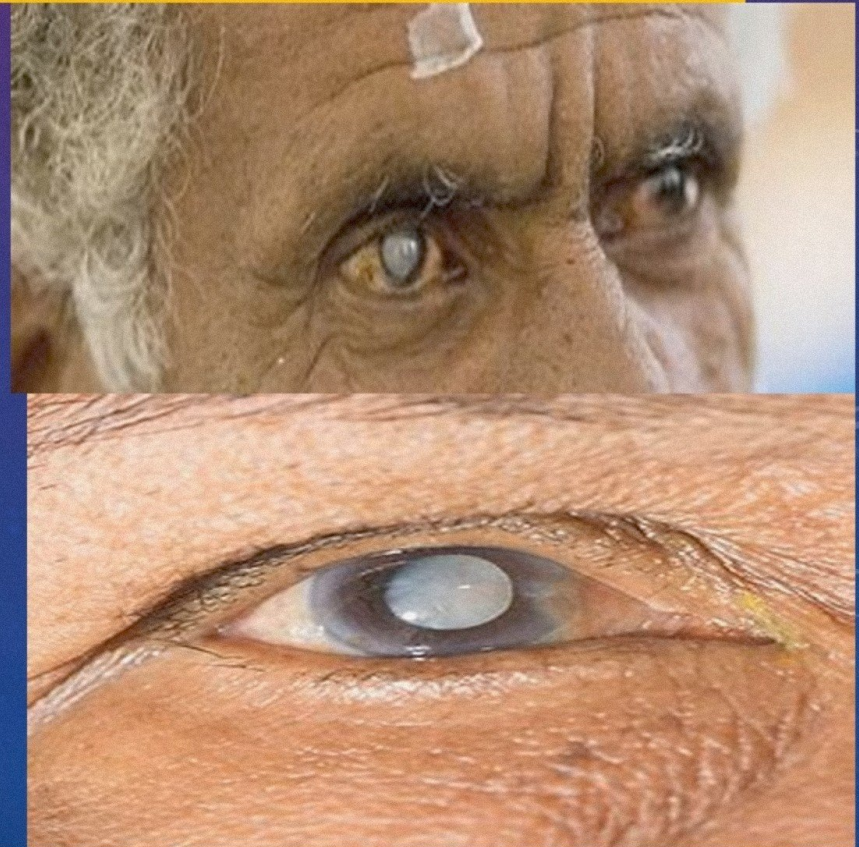
DEVELOPMENTAL V/S ACQUIRED CATARACT

- **DEVELOPMENTAL OPACITIES** are partial and stationary.
- **ACQUIRED OPACITIES** progress until the entire lens is involved, but exceptions are well known in both types.



AGE-RELATED (SENILE) CATARACT

- It is related to **ageing**.
- Caused by lifelong exposure to sunlight or ultraviolet radiation.
- Rare in persons younger than **50 years** unless associated with some metabolic disturbance such as diabetes



RISK FACTORS (WHO GETS SENILE CATARACT ?)

AGE : > 50 years

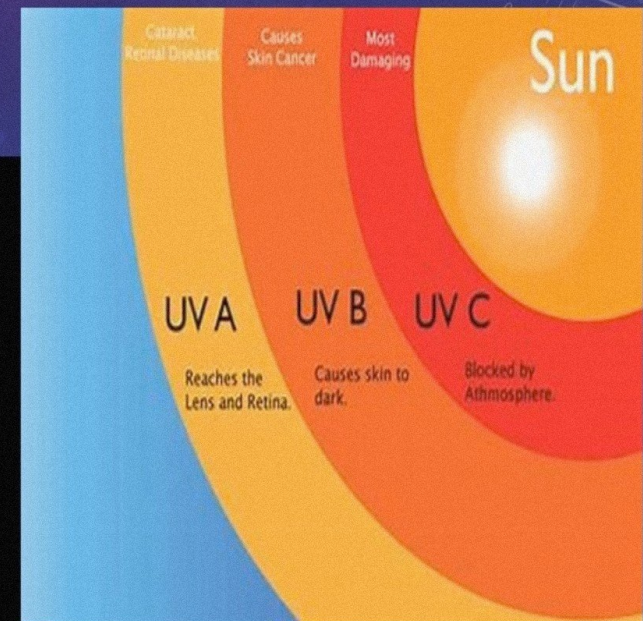
If cataract develops before
45 years → **PRESENILE**
cataract

SEX : males =
females

**ULTRAVOILET
RADIATION** → early onset
and faster maturation of
cataract



The average age at onset of cataract is approximately 10 years earlier in **tropical** countries compared to that in **temperate** climates.



- It involves loss of transparency of the lens due to changes in the proteins



DIETARY FACTORS :

deficient in proteins, amino acids , vitamins (riboflavin, vitamin E, VITAMIN C)



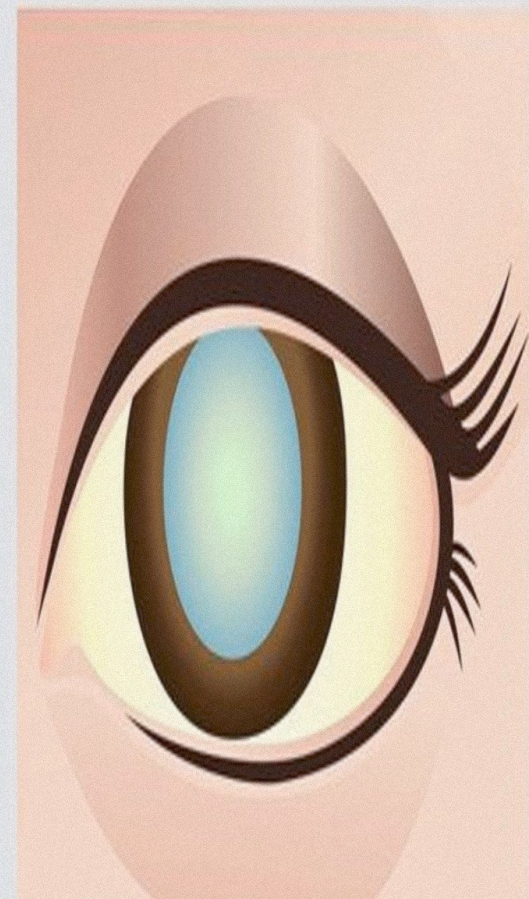
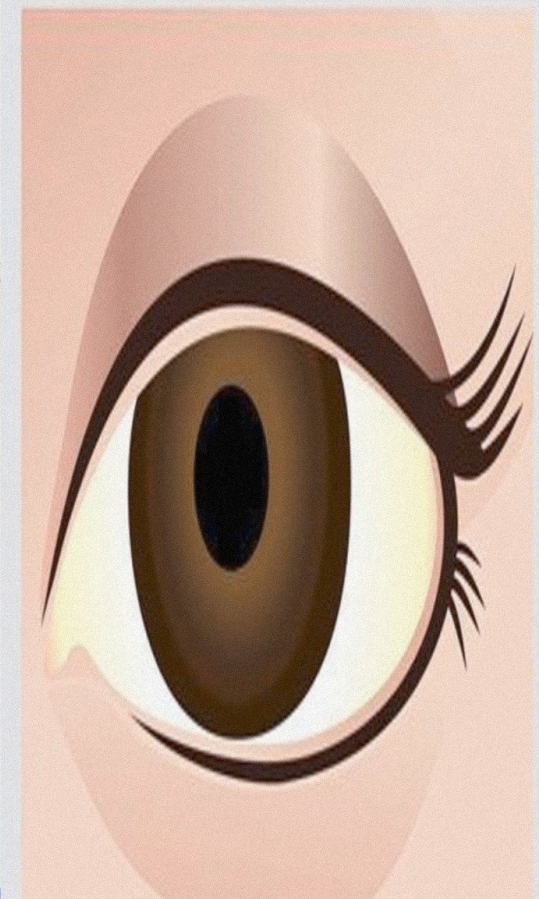
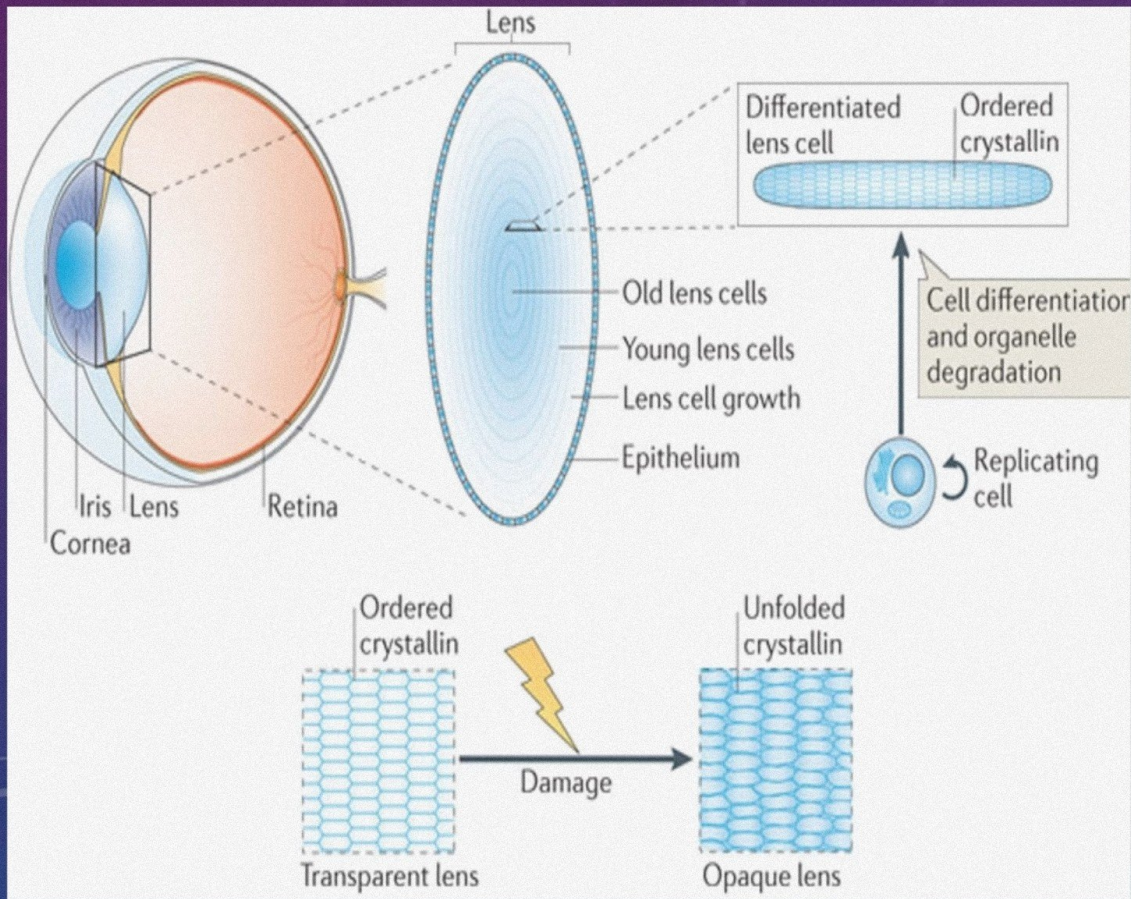
DEHYDRATION CRISIS : Prior episode of severe dehydration (diarrhoea or cholera)



SMOKING causes accumulation of the pigmented molecules →
3- hydroxykynurenine and chromophores
which lead to yellowing

CYANATES → causes carbamylating and
protein denaturation → opacification





WHY DID I GET CATARACT BEFORE 50?

Hereditary

Diabetes mellites

Atopic dermatitis

Myotonic dystrophy

PRE-SENILE
CATARACT

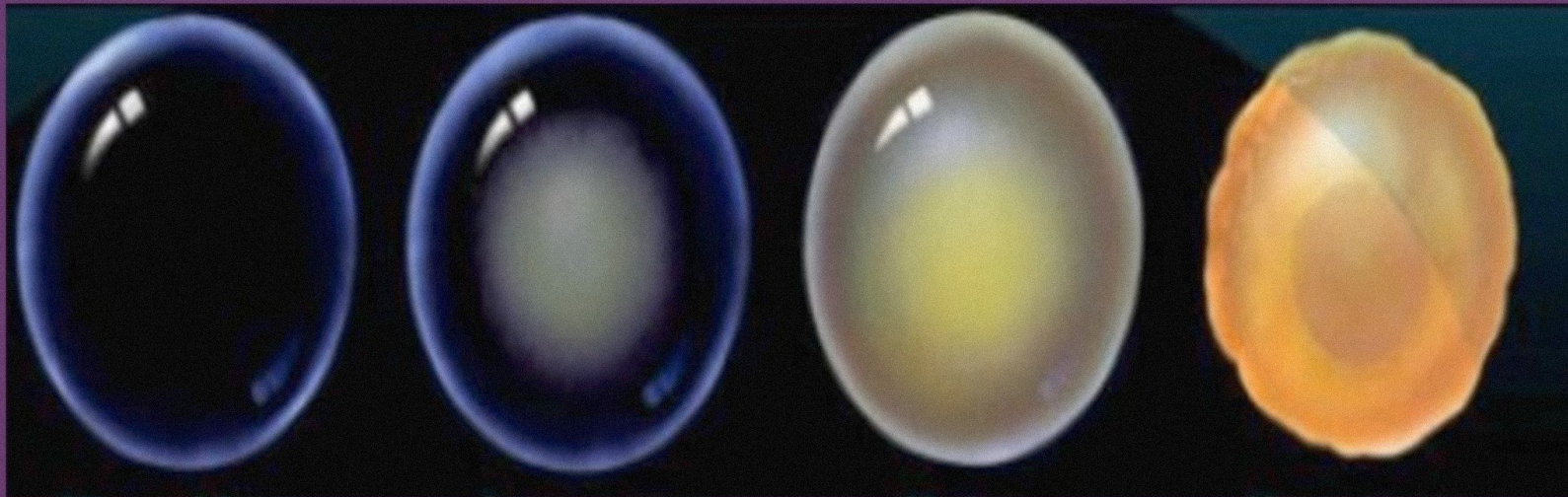


TYPES OF SENILE CATARACT

- Two types of senile cataract may occur—>
- **CORTICAL CATARACT : (SOFT CATARACT)** wherein the classical signs of hydration followed by coagulation of proteins appear primarily in the cortex
- **NUCLEAR/ SCLEROTIC CATARACT (HARD CATARACT)**
→slow sclerosis in the nucleus



- **STAGES OF MATURATION OF A SENILE CATARACT**



STAGES OF MATURATION

CORTICAL CATARACT

NUCLEAR CATARACT

- 
- STAGE OF **LAMELLAR SEPARATION**
 - STAGE OF **INCIPIENT** CATARACT (cuneiform v/s cupuliform)
 - **IMMATURE** SENILE CATARACT
 - **MATURE** SENILE CATARACT
 - **HYPERMATURE** SENILE CATARACT (morgagnian and sclerotic)



LAMELLAR SEPARATION

1

- Demarcation of the cortical fibres owing to their separation by fluid.
- This phenomenon (lamellar separation) can be seen only with a slit lamp and is invisible ophthalmoscopically.

Reversible changes



LAMELLAR SEPARATION

- A grey appearance to the pupil v/s blackness seen in the young.
- General increase in the refractive index of the cortex in old people
- The increase in reflection and scattering of light

Grey
v/s
Black hue



STAGE OF INCIPIENT CATARACT

2

- Early detectable **opacities with clear areas** between them appear in the periphery of the lens.
- Sectorial alterations in the refractive indices of the lens fibres, thus producing irregularities in refraction, some visual deterioration and **polyopia**.

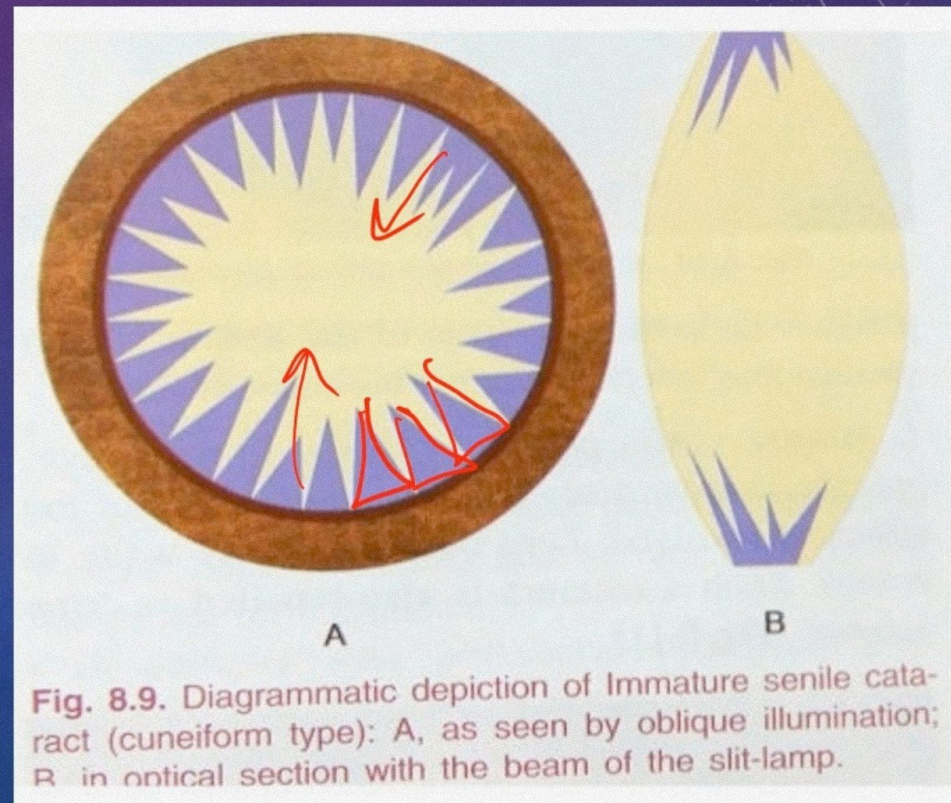
**CUNEIFORM
SENILE CATARACT**

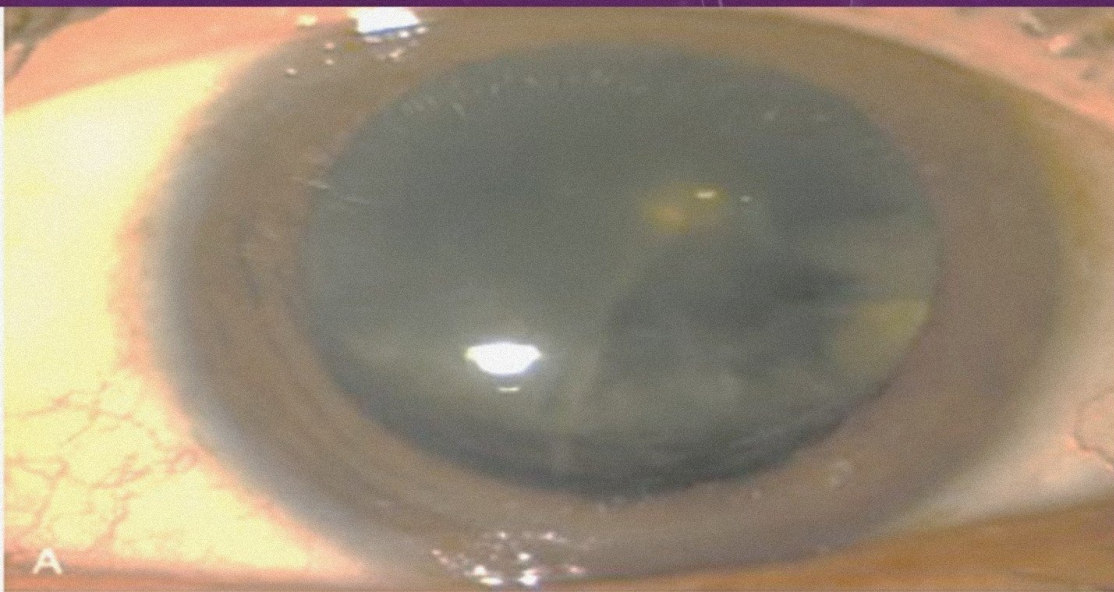
**CUPULIFORM
SENILE CATARACT**



CUNEIFORM V/S CUPULIFORM CATARACT

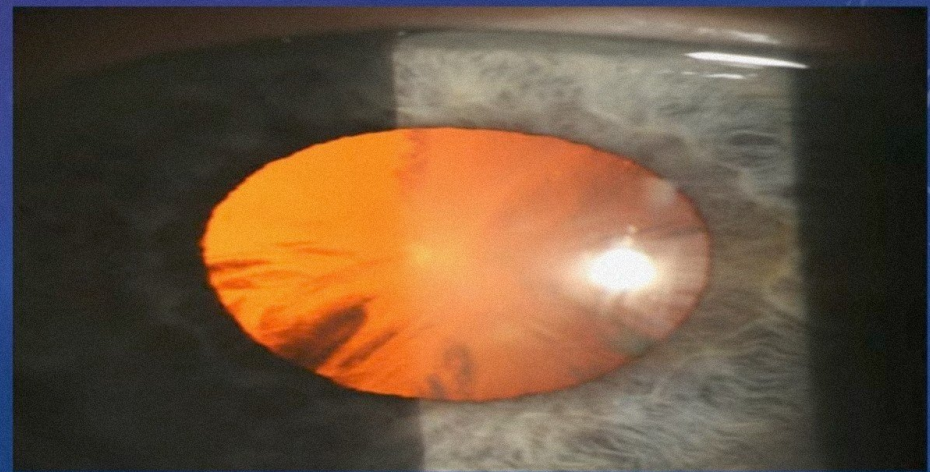
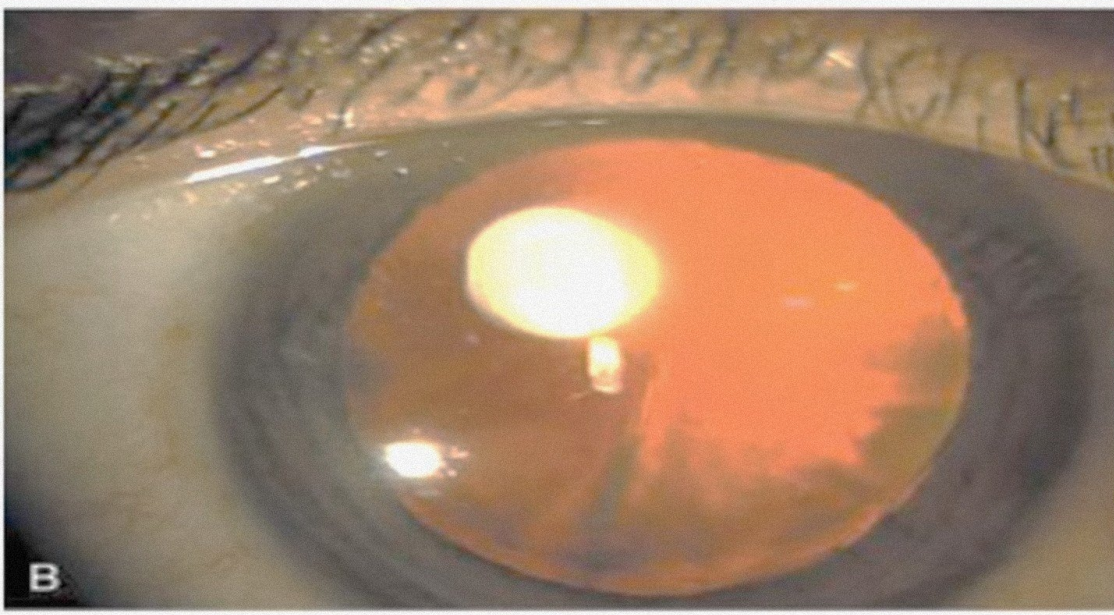
- **Wedge shaped opacities** with clear areas in between .
- Extend from equator towards the centre
- Can be demonstrated on dilatation of pupil.
- Seen in lower nasal quadrant first .



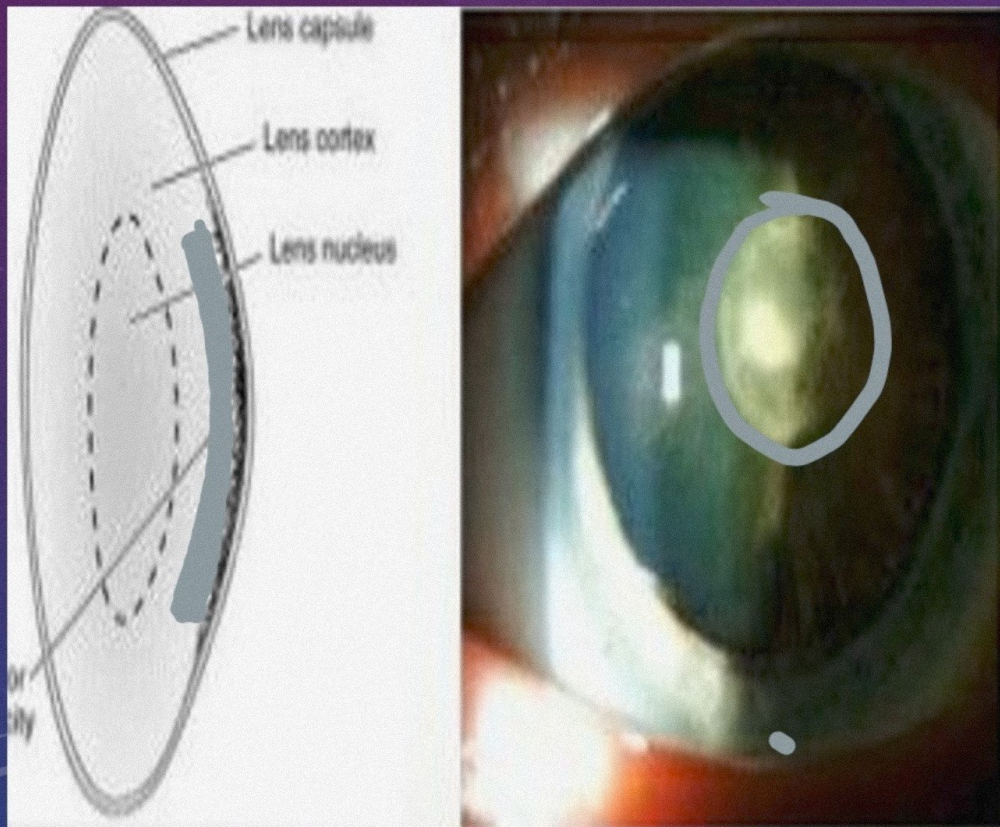


- **CUNEIFORM CATARACT**

With oblique illumination, the opacities appear grey whitish color
In retroillumination, they are black against the red background of the fundus



CUNEIFORM V/S CUPULIFORM CATARACT



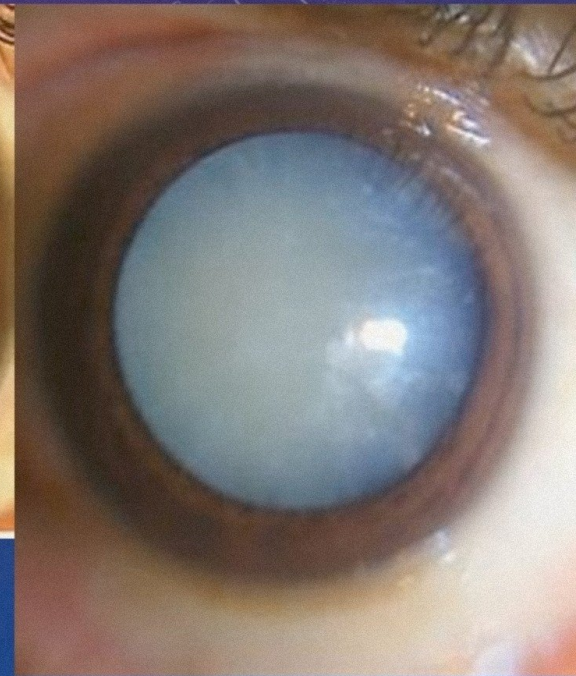
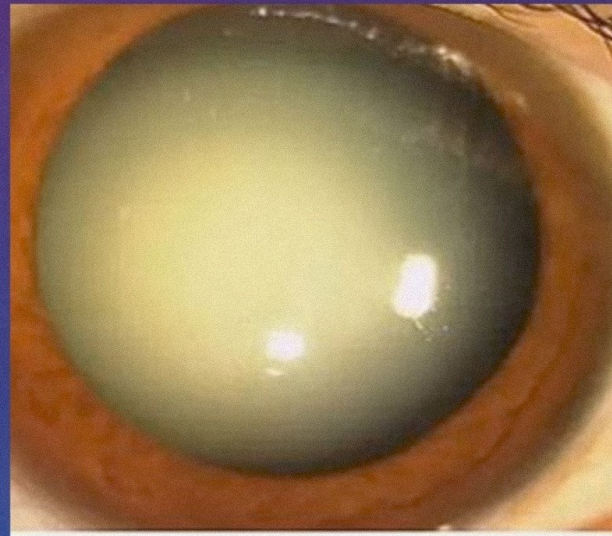
- Saucer Shaped opacity develops
- Just below the capsule in the central part of posterior cortex
- POSTERIOR SUBCAPSULAR CATARACT
- It gradually extends outwards
- Lies in pupillary axis so vision is affected early.
- **NEAR VISION IS AFFECTED MORE THAN THE DISTANT VISION**

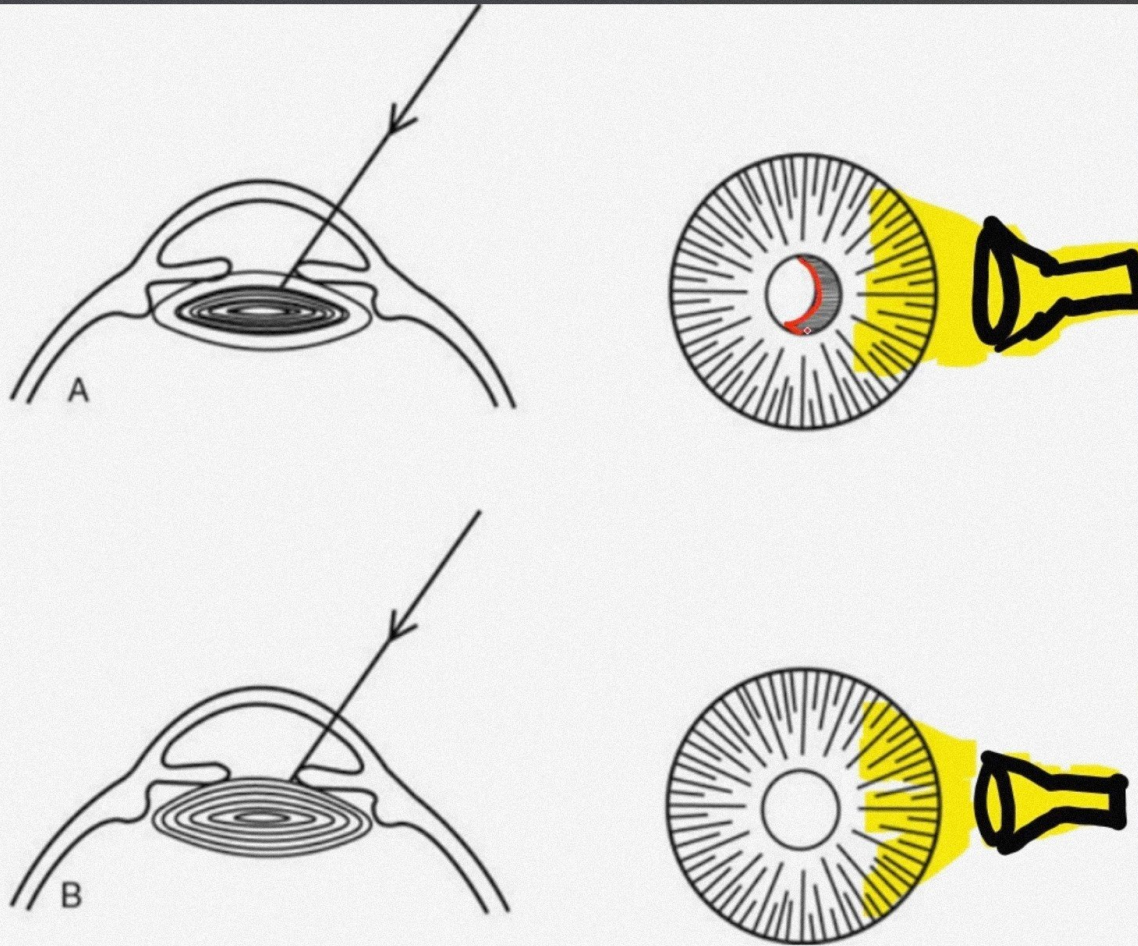


STAGE OF IMMATURE CATARACT

3

- Opacification further continues but is not complete
- Lens appears greyish white in color but clear cortex is still present
- This is called stage of **immature senile cataract** .





• **FIG. 15.4 (A and B)** Use of iris shadow to diagnose the maturity of cataract. The eye is illuminated from the temporal side and shadow of iris cast on the lens surface is analysed (by courtesy of Hamblin).
(A) Immature cataract with presence of an iris shadow. **(B)** Mature cataract, totally opaque lens with no iris shadow.



CONCEPT OF IRIS SHADOW

- **Immature cataract** → clear space between the lens opacity and the iris → the iris throws a shadow upon the grey opacity when light is cast upon the eye from one side
- **Mature cataract** → the cortex is completely opaque, the pupillary margin lies almost in contact with the opacity, separated only by the capsule; the iris then throws **no** shadow,



INTUMESCENT CATARACT ?

- In some patients at the stage of immaturity
- Lens gets excessively hydrated and SWOLLEN
- This is called **intumescence**
- Anterior chamber becomes shallow

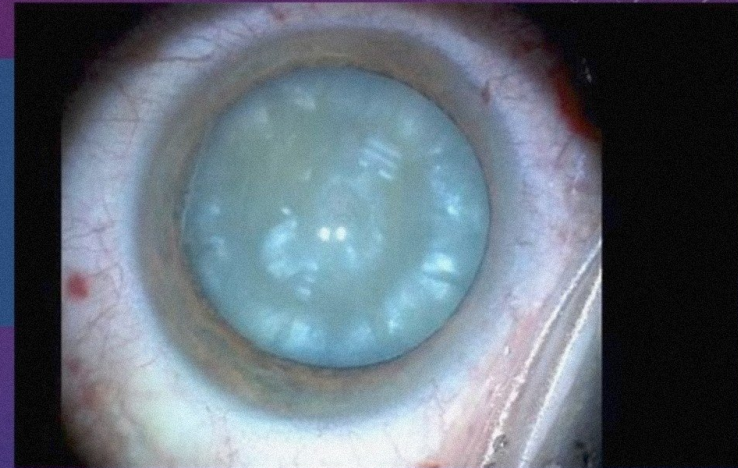
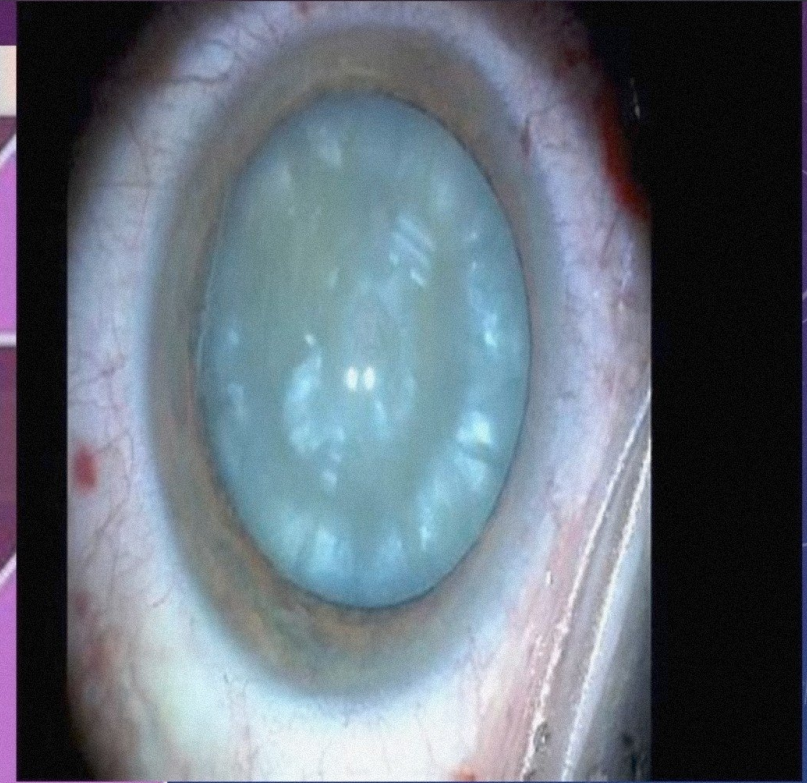


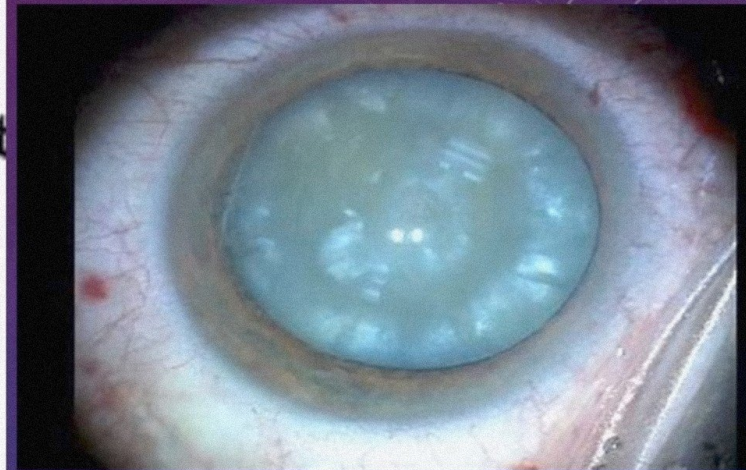
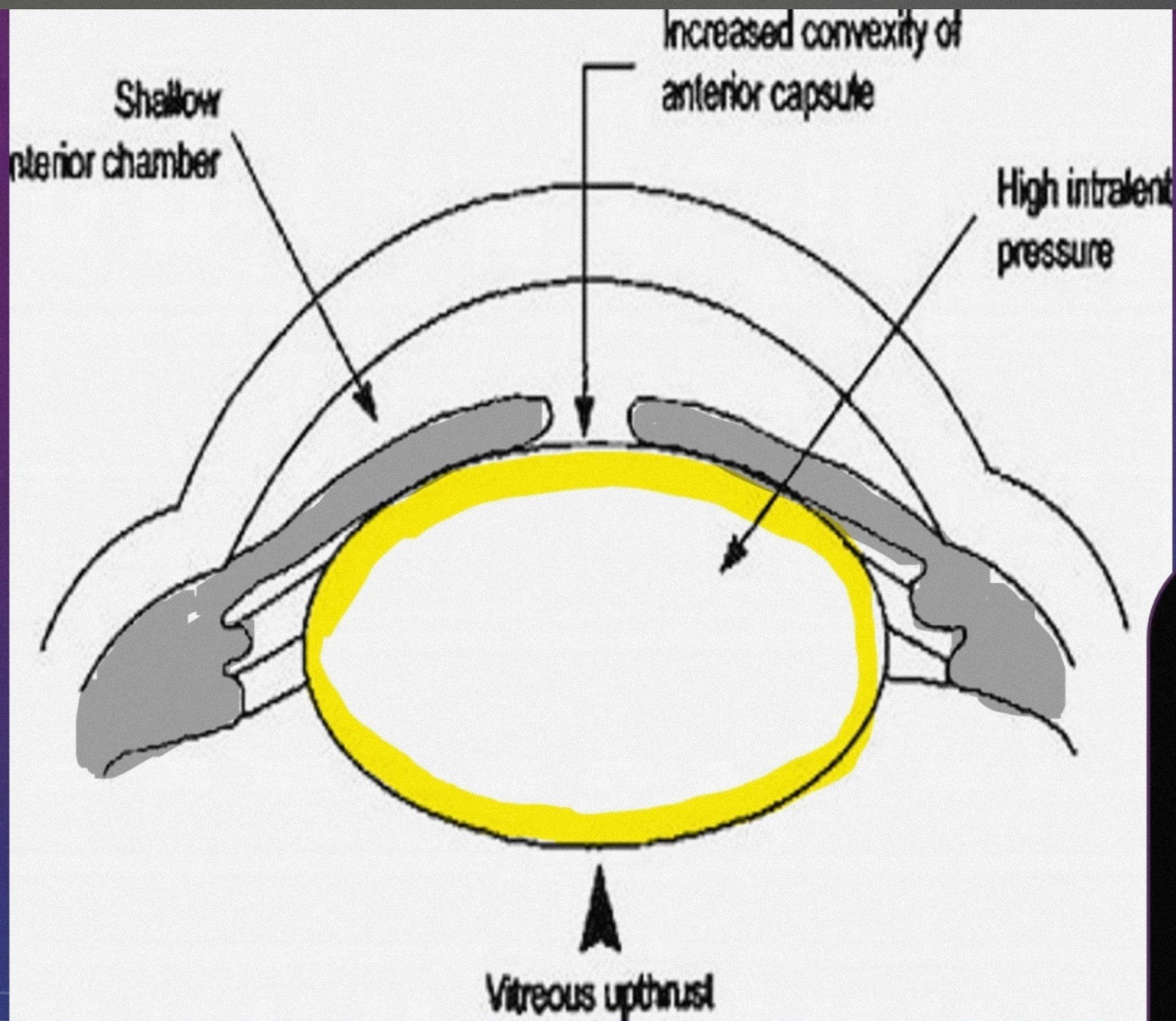
Figure 11. Clinical photograph of a cortical cataract with prominent cortical fluid clefts (black lines).



Increase **osmotic pressure** inside the lens

Lens continue to absorb an increasing amount of aqueous & become swollen with **stretched-glistening capsule**





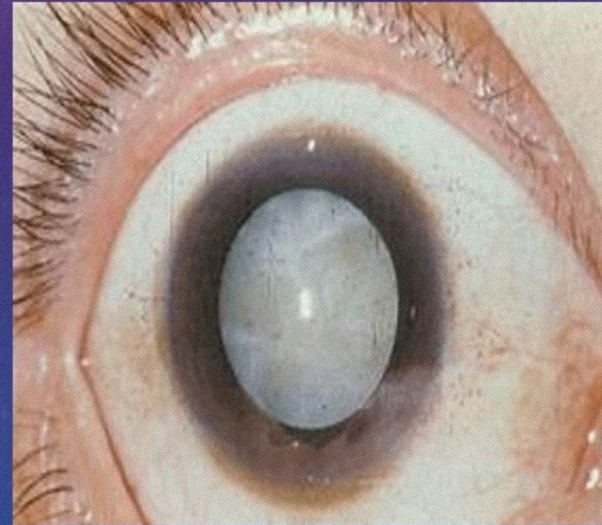
SHALLOW AC → pupillary block risk of
**phacomorphic
glaucoma**

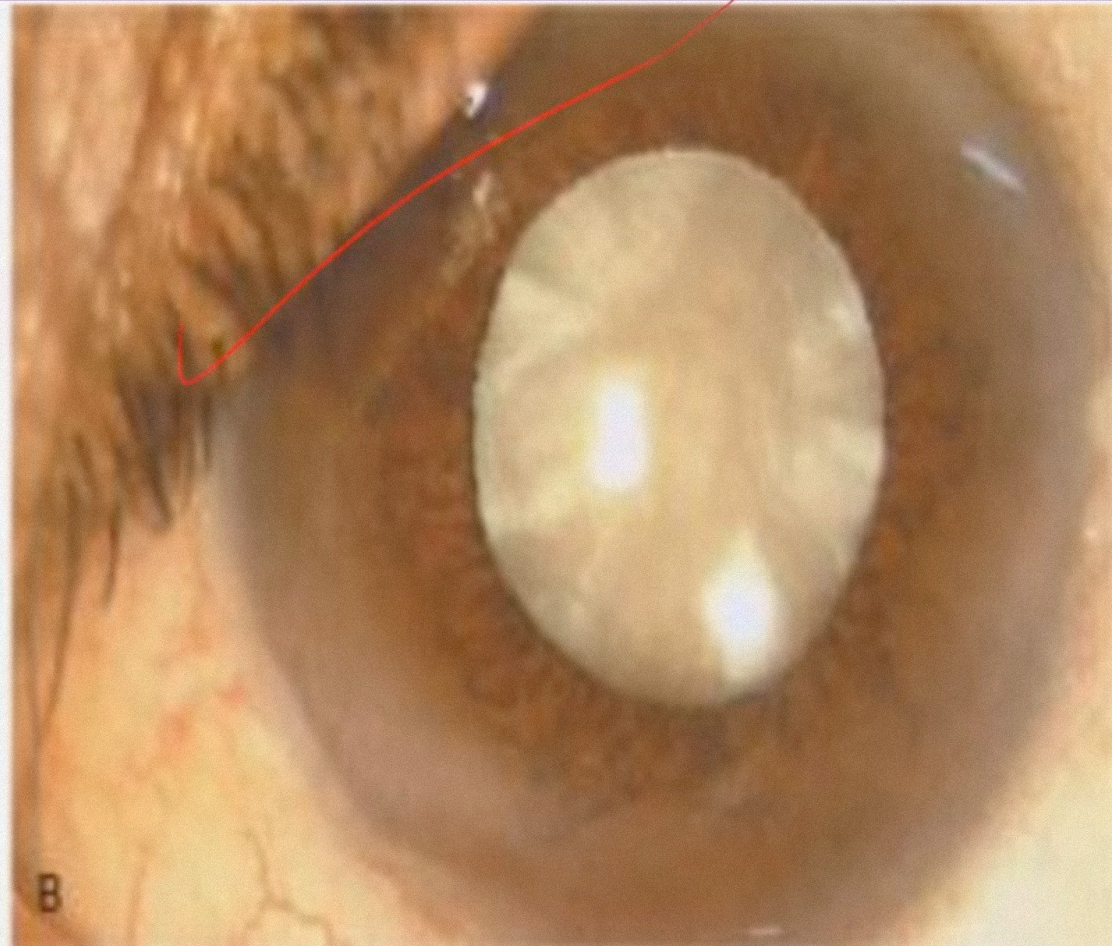
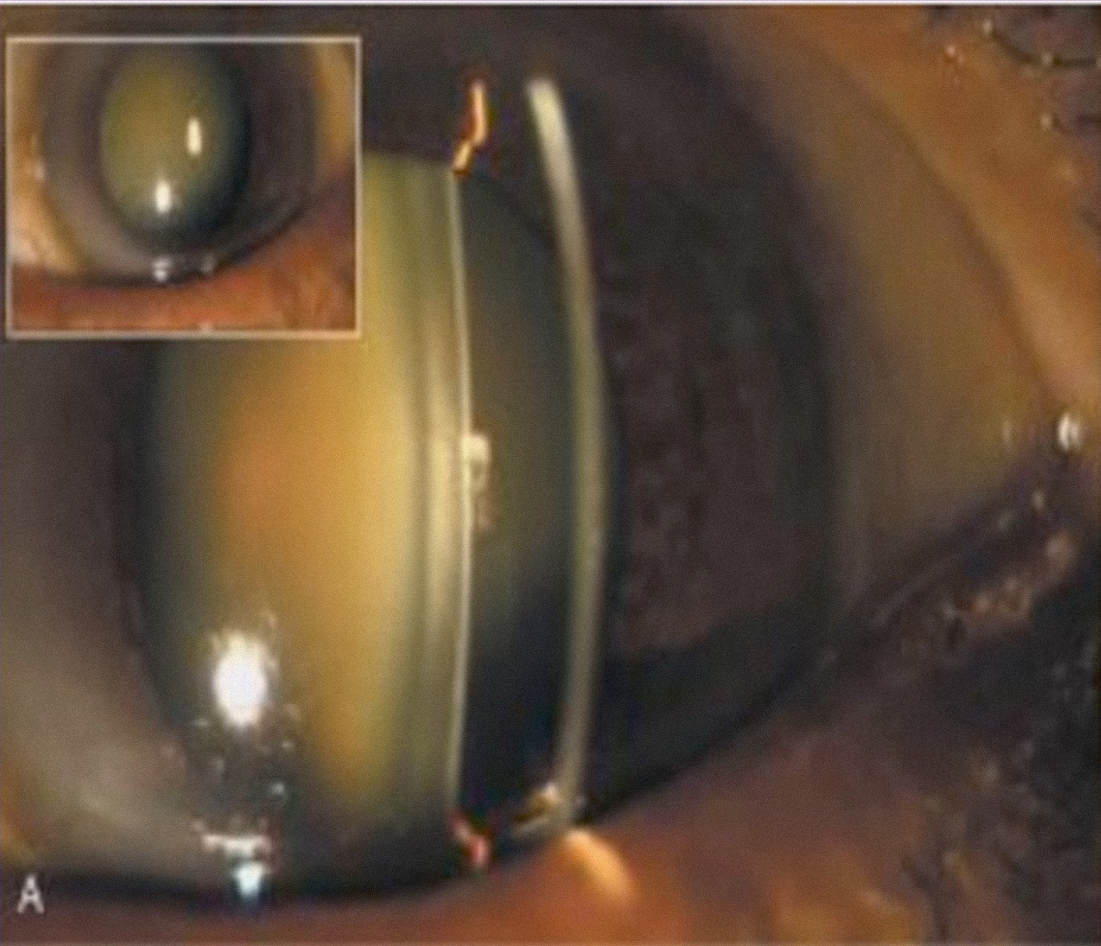


STAGE OF MATURE SENILE CATARACT

4

- Opacification become complete
- Whole cortex is involved
- No iris shadow seen
- Intumescence continues
- **PEARLY WHITE COLOR**
- Also called 'ripe cataract'





• **FIG. 15.5** (A) Slit-lamp view of an immature senile cataract showing the zones of disjunction and (inset) diffuse view showing an iris shadow. (B) Mature senile cataract.



HYPERMATURE SENILE CATARACT

5

- When mature cataract is left insitu → hyper maturity sets in !



HYPERMATURE SENILE CATARACT

5

- When mature cataract is left insitu → hyper maturity sets in !

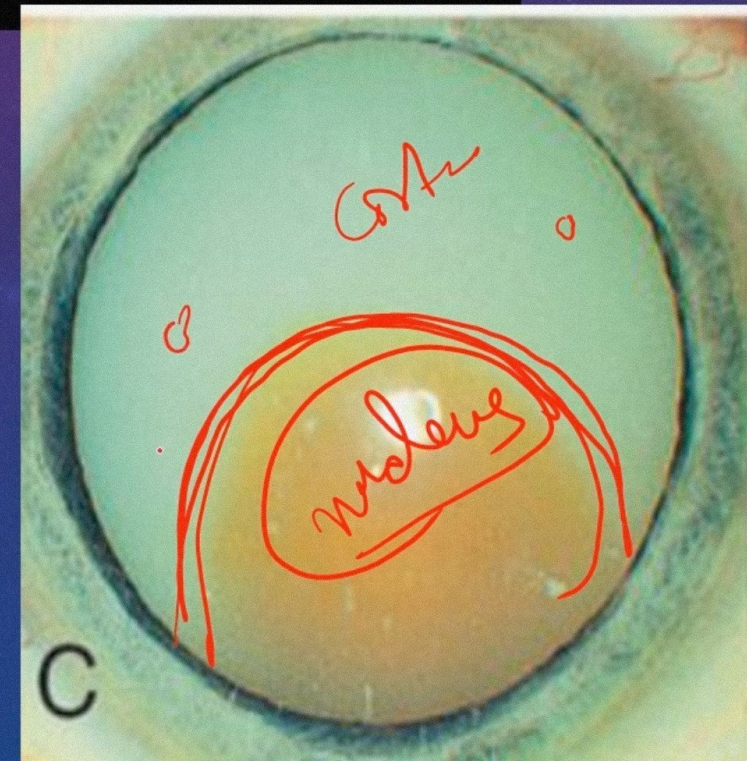
**MORGAGNIAN HYPERMATURE
CATARACT**

**SCLEROTIC HYPERMATURE
CATARACT**



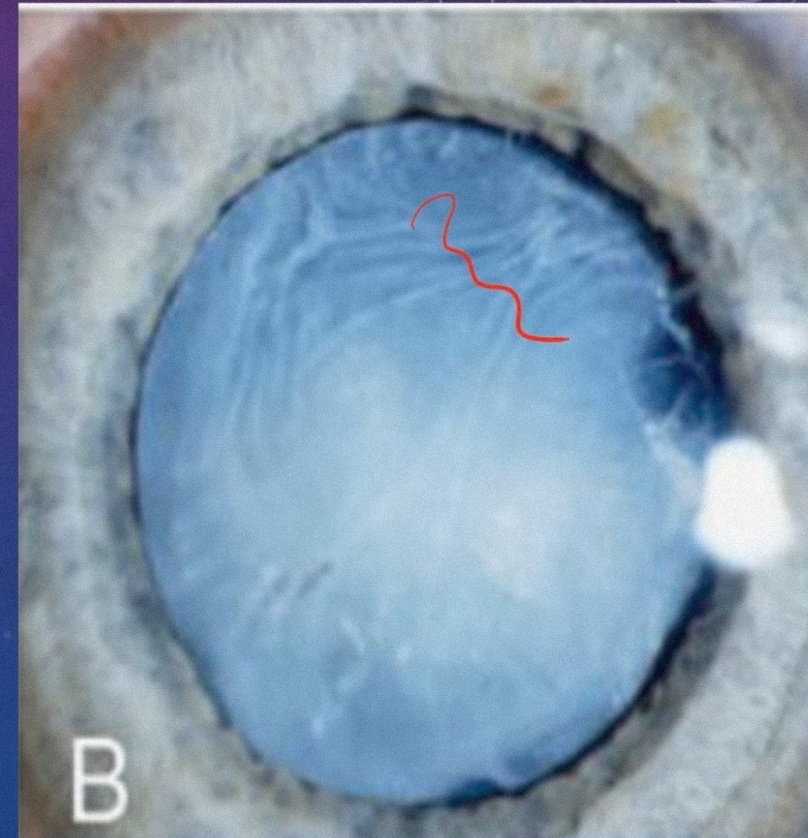
MORGAGNIAN HYPERMATURE CATARACT

- The whole cortex liquified
- Small brownish nucleus may sink to the bottom of the lens.
- The liquefied cortex is milky, and the nucleus is seen as a brown mass limited above by a semicircular line, altering its position with changes **in position of the head**.
- Sometimes **calcium deposits** can be seen on the lens capsule



SCLEROTIC HYPERMATURE CATARACT

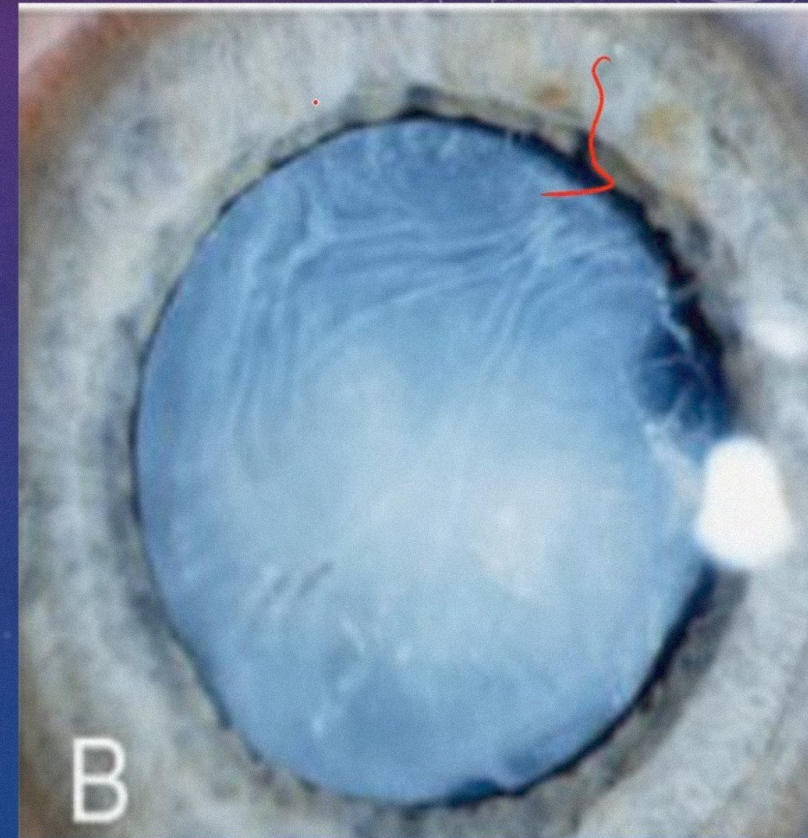
- The cortex becomes disintegrated and is transformed into a pultaceous mass.
- **Shrunken and inspissated lens**
- **Thickened anterior capsule** due to proliferation of the anterior cubical cells, so that a dense white capsular cataract (sometimes with capsular calcification) is formed at the anterior pole in the pupillary area.



SCLEROTIC HYPERMATURE CATARACT

Phacodonesis

- The lens and iris become **tremulous (iridodonesis)**
- The anterior chamber **deep**, and, finally, **degeneration** of the suspensory ligament may lead to luxation of the lens



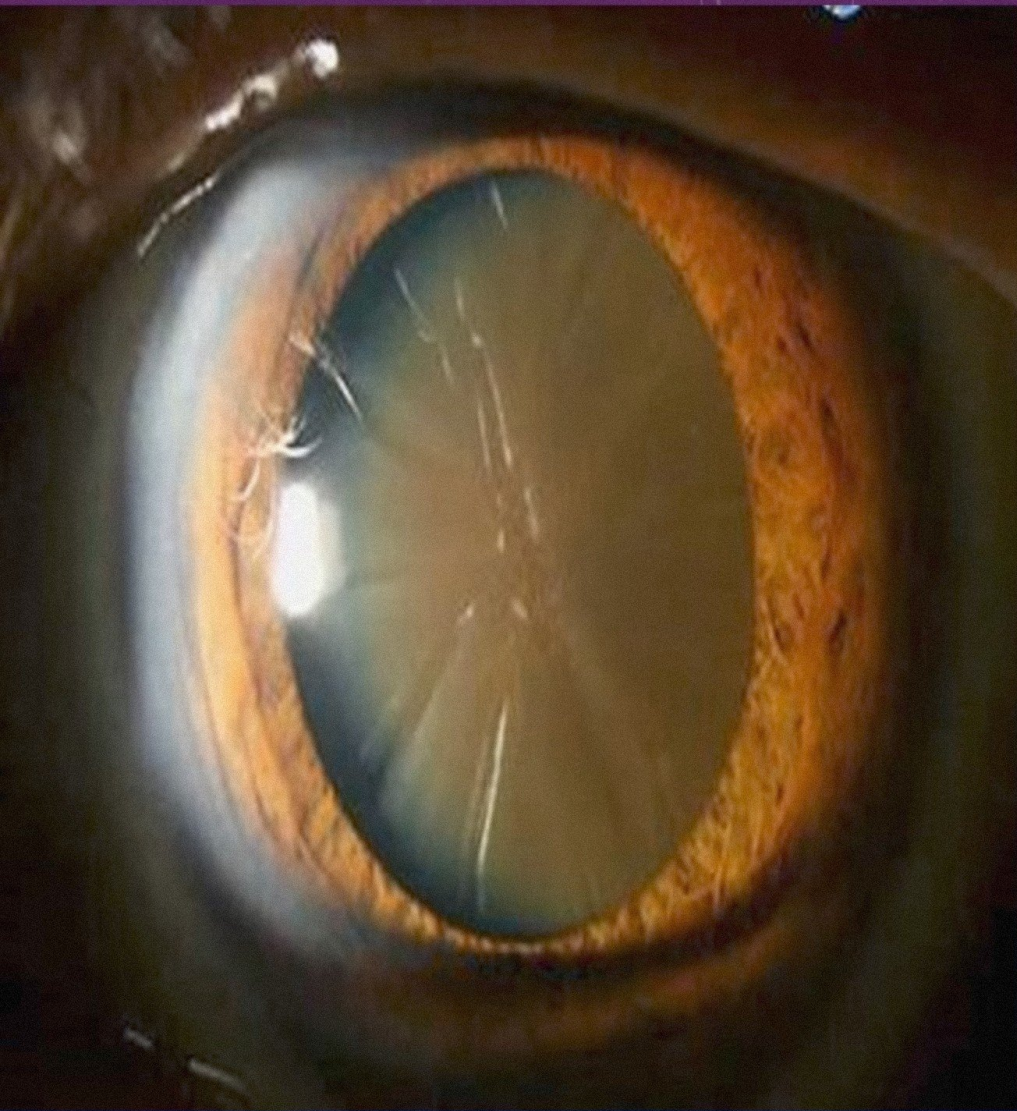
MATURATION OF NUCLEAR SENILE CATARACT



NUCLEAR SCLEROSIS

- Progressive sclerosis or hardening of the **nucleus** starts first and spread peripherally
- This type of cataract tends to occur earlier than the cortical variety, often soon after **40 years of age**.
- Progress is usually **very slow** and hyper maturity generally does not occur in nuclear cataract.





Brunescient cataract

- The nucleus becomes diffusely cloudy
- OR **tinted** owing to the deposition in the lens of yellow pigmented proteins derived from the amino acid tryptophan, altered by the action of sunlight



TERMS

- **Cataracta Brunescens → Brown Cataract**
- **Cataracta Nigra → Black Cataract**
- **Cataracta Rubra → Red Cataract**

