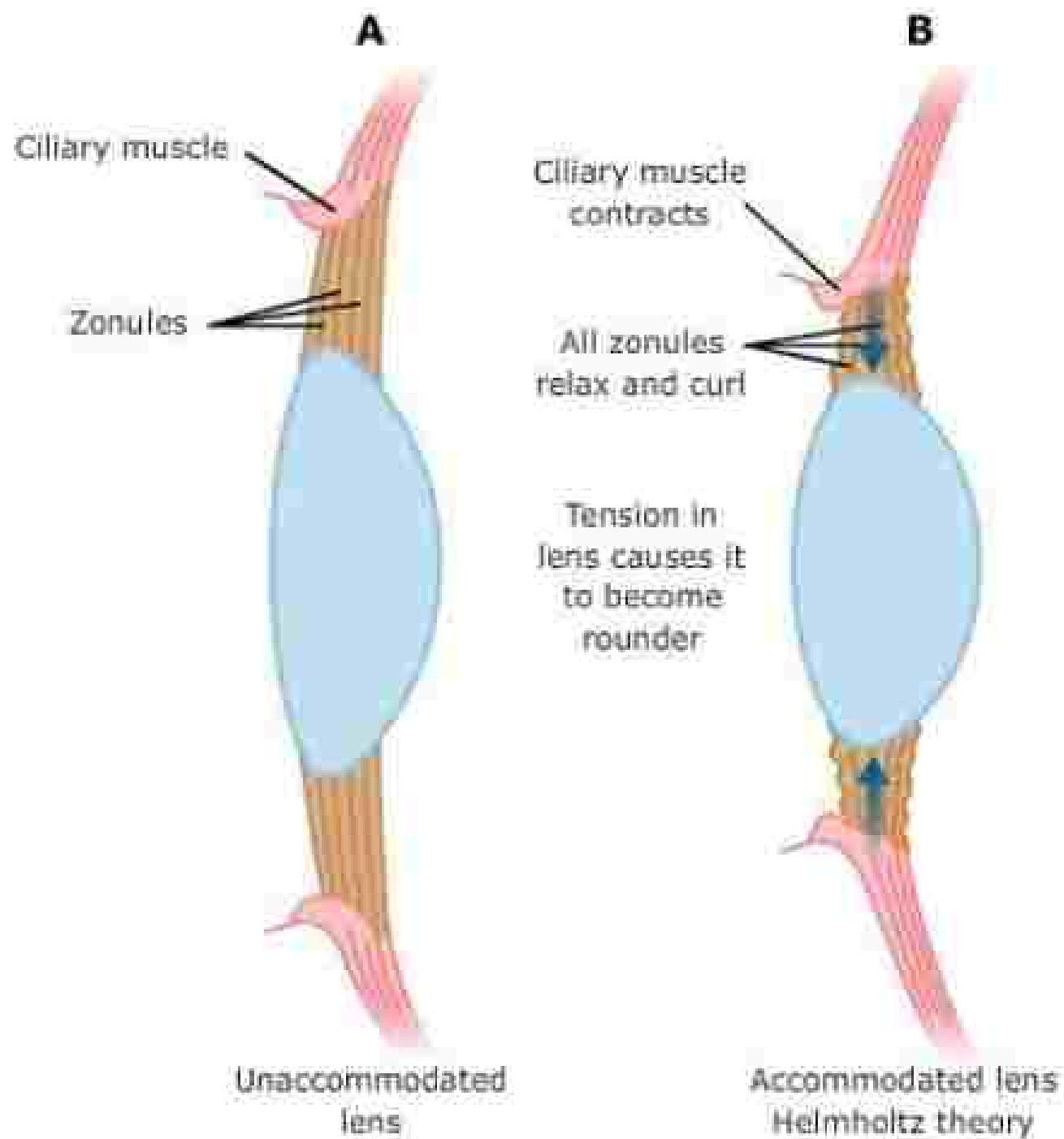
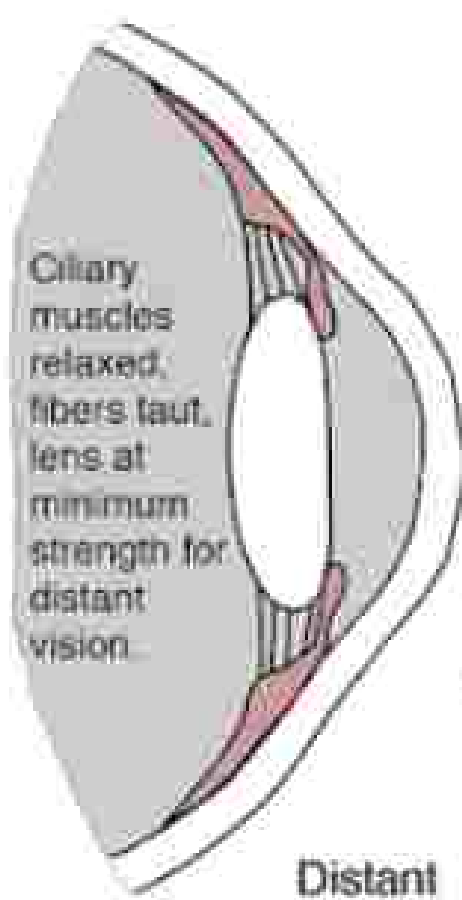


Accommodation

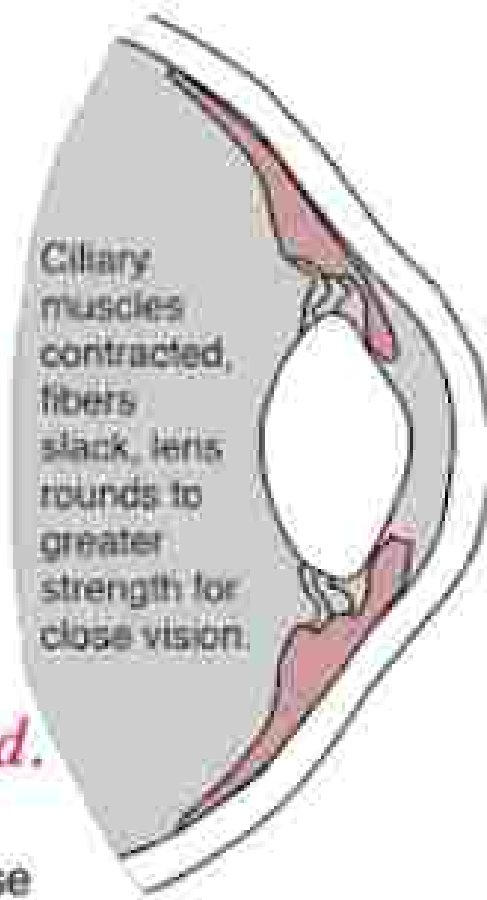
# Accommodation

Accommodation is eye's ability to **change the dioptric power of the eye** in order to focus an object at different distances by changing the convexity of the interior surface of the lens, with the help of ciliary muscle.

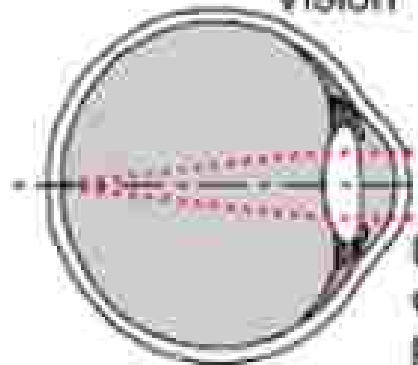




*The eye accommodates for close vision by tightening the ciliary muscles, allowing the pliable crystalline lens to become more rounded.*

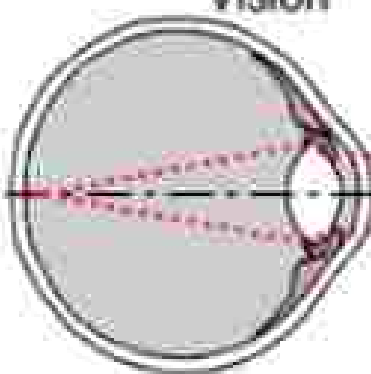


Distant Vision



Light rays from distant objects are nearly parallel and don't need as much refraction to bring them to a focus.

Close Vision



Light rays from close objects diverge and require more refraction for focusing.

# Mechanism of eye's accommodation

- To focus on distant objects the ciliary muscles relax and move back to make the eye lens thin.
- This increases the focal length of the eye lens and thus distance objects are seeing clearly.
- However, to focus on nearby objects the ciliary muscles contracts and move forward by  $10\text{ mm}$ , anterior part of the ciliary zonule relaxes, this changes the radius of curvature from  $10\text{ mm}$  to  $6\text{ mm}$  and make the eye lens thick and decreases the focal length of the eye which helps to see nearer objects clearly.

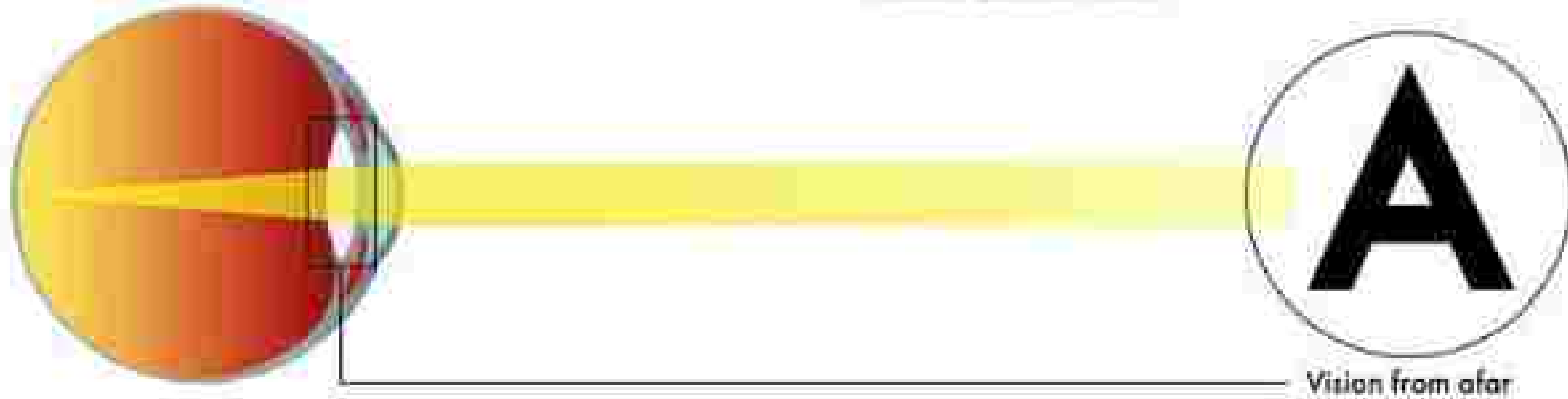
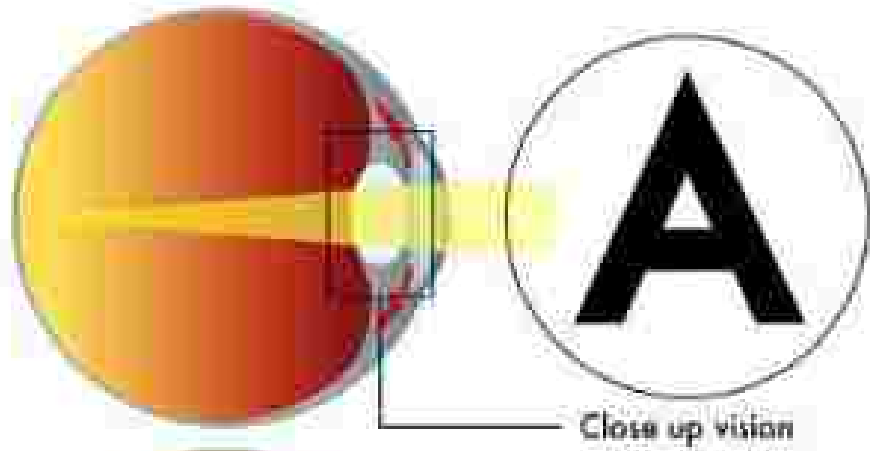


# Factors that influenced the process of accommodation

- ① the ability of the **lens** to change its shape.
- ② the strength of the **ciliary muscle**.
- ③ Astigmatism.
- ④ **Object** size, and distance.
- ⑤ Even mood, illumination and contrast have some influence.

## Visual Accomodation

Function that modifies the curvature of the crystalline lens, and allows you to adapt quickly, to the vision from afar or close up.

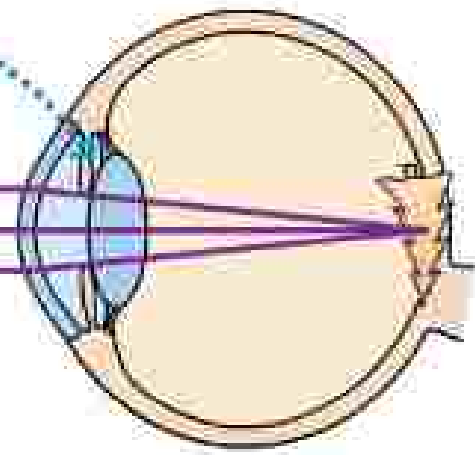




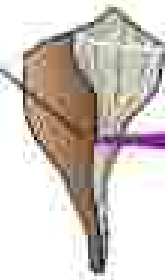
Far point (FP): most distant point on which the eye can focus



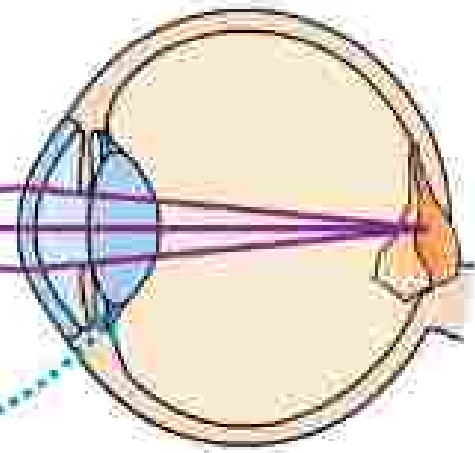
When the eye focuses on distant objects, the ciliary muscles are relaxed and the lens is less curved.

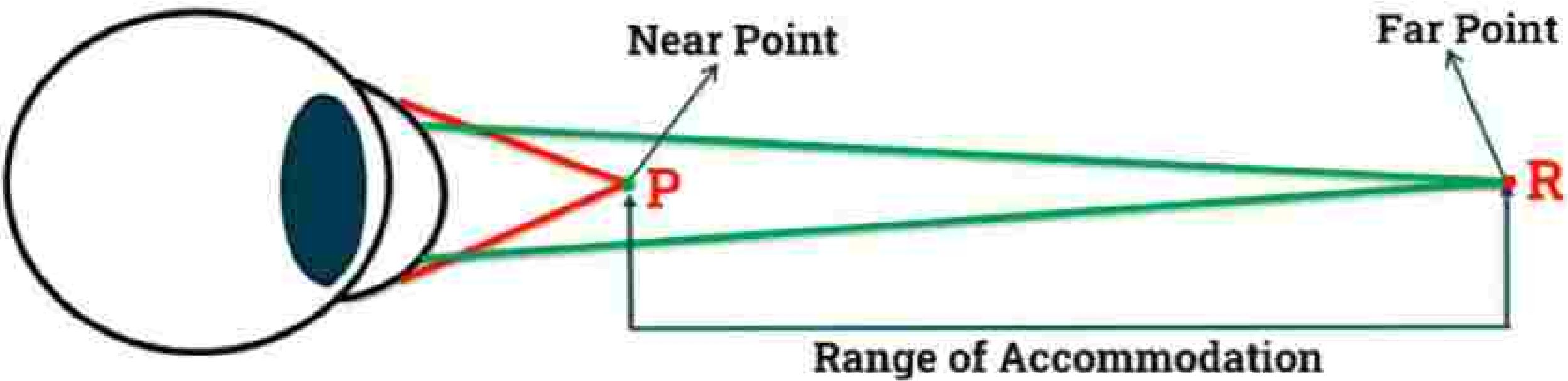


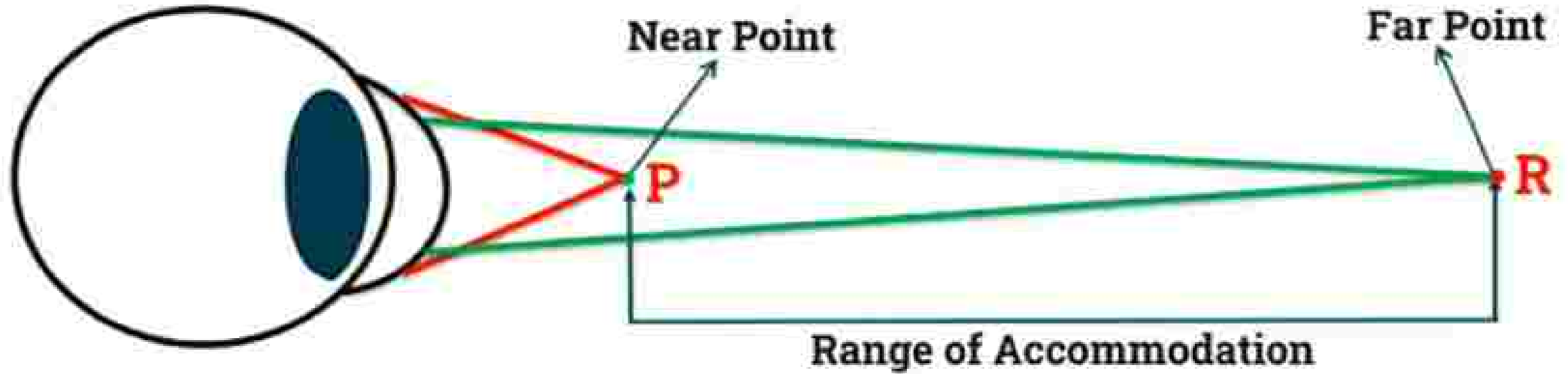
Near point (NP): closest point on which the eye can focus



When the eye focuses on nearby objects, the ciliary muscles are contracted and the lens is more curved.







$$A = P - R$$

A= Amplitude of accommodation.

P= Amplitude of accommodation at near point.

R= Amplitude of accommodation at Far point.

# The range and Amplitude of Accommodation

- **The far point (Punctum remotum) ( r ) , in meters** : the position of an object such that its image falls on the retina in the relaxed eye, i.e. in the absence of accommodation.
- The far point of the emmetropic eye is at infinity .
- **The near point (punctum proximum) (p) in cm** : is the nearest point at which an object can be clearly seen when maximum accommodation is used .
- **Range of accommodation (a)** : is the distance between the far point and near point  $a = r - p$ .

- **Amplitude of accommodation (In diopters)(A):** is the difference in dioptric power between the eye at rest (**P**) and the fully accommodated eye (**R**) which mean the total amount by which an eye can change its power.

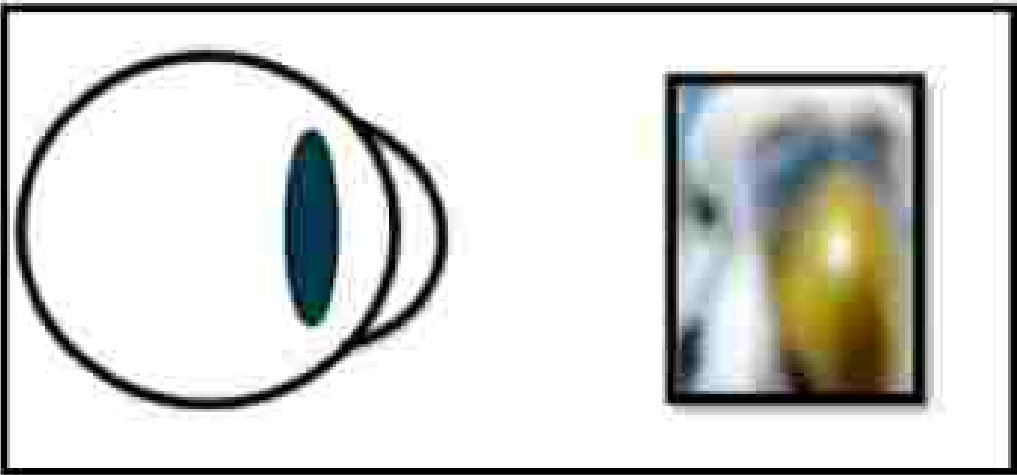
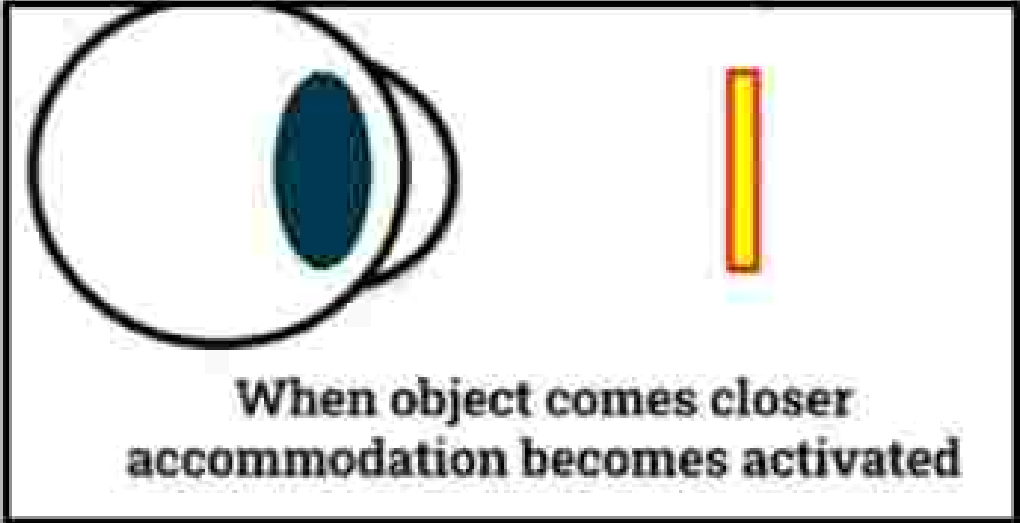
$$A = P - R$$

We can easily understand that the lens which enables an eye to see at its near point without its accommodation is a measure of the amplitude of accommodation, giving to rays which come from the near point a direction as if they came from the far point .

- **Example:**

- Supposing for emmetrope :  $r$  (the far point) =  $\infty$ ,  $p$  (the near point) =  $25 \text{ cm}$
- $P$  (refractive power of near point) =  $4 \text{ D}$  (reciprocal of  $0.25 \text{ m}$ )  $R$  (refractive power of far point) =  $0 \text{ D}$  (reciprocal of infinity is zero)  $A$  (the amplitude of accom.) =  $4 \text{ D} - 0 \text{ D} = 4 \text{ D}$

# Types of Accommodation



# Types of Accommodation

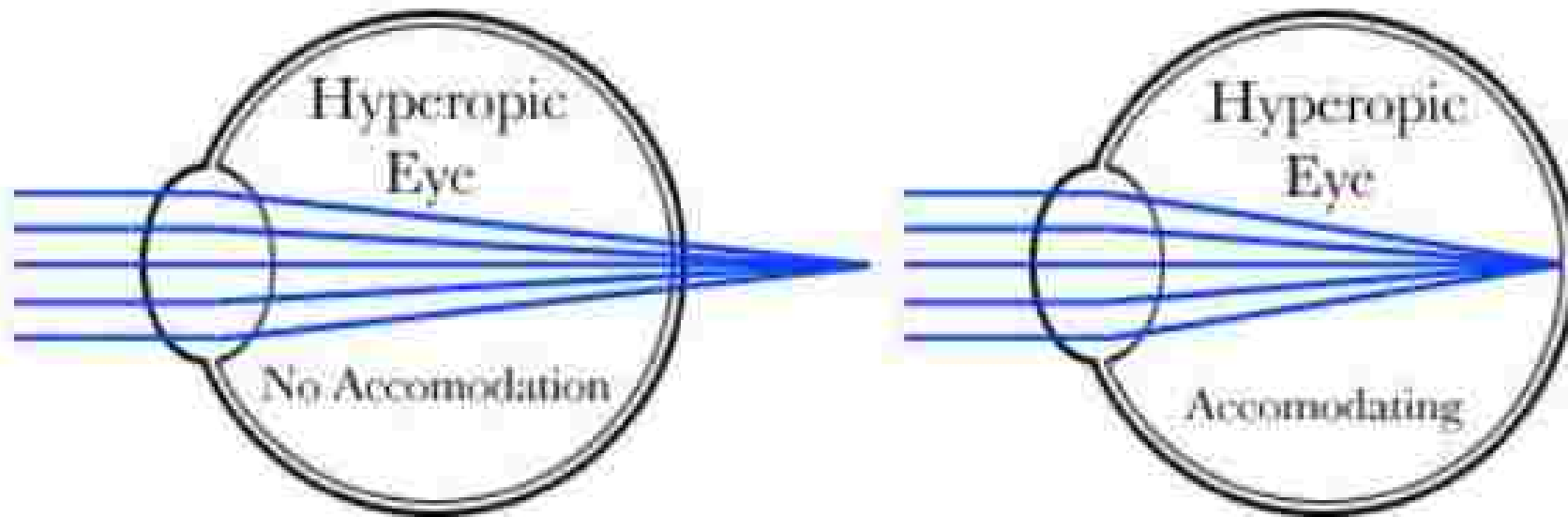
- ① **Tonic accommodation** : It is due to tonus of ciliary muscle and is active in absence of a stimulus . The resting state of accommodation is not at infinity but rather at an intermediate distance .
- ② **Proximal accommodation** : is induced by the awareness of the nearness of a target . This is independent of the actual dioptric stimulus.
- ③ **Reflex accommodation** : is an automatic adjustment response to blur which is made to maintain a clear and sharp retinal image.
- ④ **Convergence-accommodation** : Amount of accommodation stimulated or relaxed associated with convergence .



# Accommodation and errors of refraction:

## ① The effect of accommodation on hypermetropia :

- Hypermetropia has the advantage that he can compensate for his refractive error by accommodative effort with disadvantage that must use it for distant and near work, that need the ciliary muscle must be still greater .



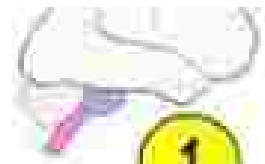
## ② The effect of accommodation on myopia :

When an uncorrected myopic eye accommodates while viewing a distance object, the focal point moves even further away from the retina. The blur on the retina will be even worse, so a person with myopia will not be able to see more clearly if they accommodate.

### ③ The effect of accommodation on Astigmatism :

If the amount of astigmatism is small, and the person is young, unaided vision might be alright (but still not perfect) for both distance and near. In this case, the young person with astigmatism often has asthenopia (eye strain) or headaches. This is because young people have very active accommodation and often try to use their accommodation to compensate for astigmatism will not work and vision will remain poor

# Phenomena Associated with Accommodation



1

Convergence

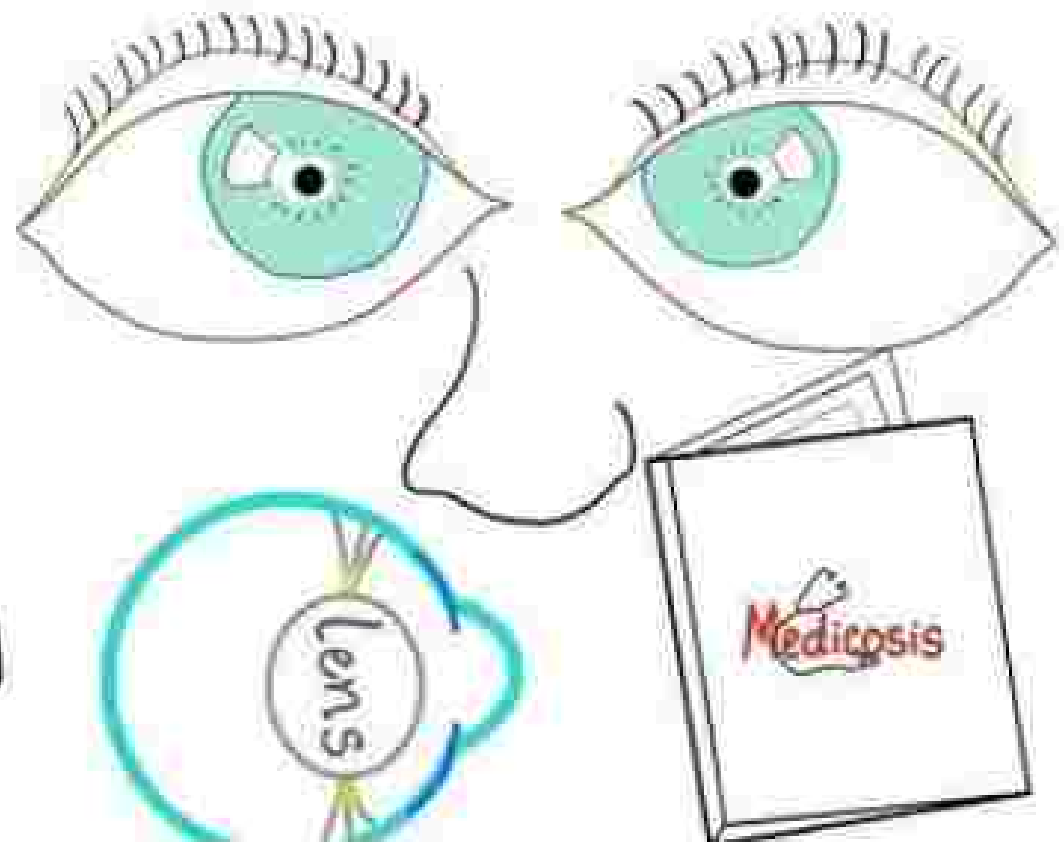
2

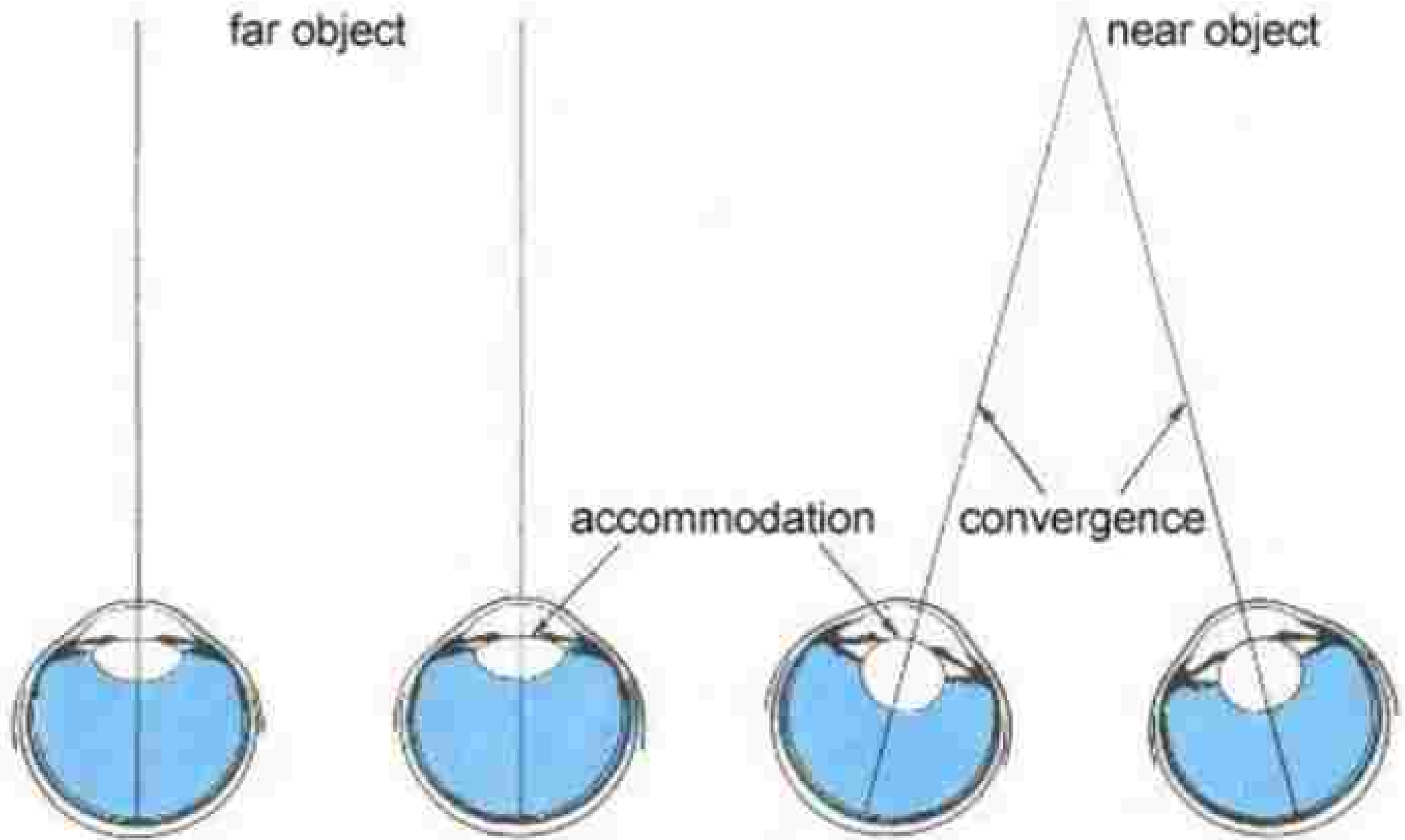
Miosis

Medicosis

3

Accommodation





# Phenomena Associated with Accommodation

- 1 Convergence** : When looking at distance object the eyes are directed straight forwards, in order that the parallel rays of light can fall upon the macula, but if a near object is be closed to the eye, they must be turned inwards so that their visual axes are both directed upon it. The nearer the object the greater will need to be convergence and the greater the accommodation.
- 2 Miosis** : in looking at such a near object, this action increases the acuity of vision by cutting off the relative increase of light which enters the eye from near objects.

Unaccommodated eye	Accommodated eye
The ciliary muscle is relaxed.	sphincter – like action of circular muscle fibers contraction
Aqueous and vitreous humor push outward on the sclerotic coat.	contraction of ciliary muscle
Ligaments become taut/ tensed.	Distance between edges of ciliary body decreases
Lens pulled into a thin shape	Relaxation of suspensory ligament
Focal length become short.	Lens becomes thicker
	Focal length shortens

# Questions

- What's the amplitude of accommodation at  $\xi \cdot \text{cm}$ ?



**Afferent Pathway:**

Retina



Visual Pathway



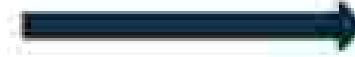
Primary Visual Cortex

**Efferent Pathway:**

Parasympathetic  
Oculomotor  
Nuclei

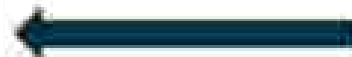


Oculomotor  
Nerve(3<sup>rd</sup> Nerve)



Ciliary ganglion

Sphincter pupillae &  
ciliary muscle



Short Ciliary  
Nerve



# Cataract

د. أحمد شاكر شناوه  
أخصائي طب وجراحة العيون

## Cataract

A Cataract is a dense, cloudy area that forms in the lens of the eye. As a person ages, a cataract begins when proteins in the eye clump together, preventing the lens from sending clear images to the retina. The retina works by converting the light that comes through the lens into signals, which it sends to the optic nerve, which carries them to the brain.

It develops slowly and eventually interferes with your vision- you might end up with cataracts in both eyes but they usually don't form at the same time.

Cataracts are common in older people. Over half of people in the United States have cataracts or have undergone cataract surgery by the time they are 80 years old, according to the National Eye Institute.

## Symptoms of cataracts

1. Blurry vision.
2. Trouble seeing at night.
3. Seeing colors as faded.
4. Increased sensitivity to glare.
5. Halos surrounding light. Double vision in the affected eye.
6. A need for frequent changes in prescription glasses.

## What Causes Cataracts ?

There are Several underlying causes of cataracts these include:

- 1 An over production of oxidants which are Oxygen molecules that have been chemical altered due to normal daily life.
- 2 Smoking .
- 3 ultraviolet radiation .
- 4 the long-term use of Steroids and other medications.
- 5 Certain diseases such as Diabetes.
- 6 Trauma.

## Risk Factors of Cataracts

Risk Factors associated with cataracts include:

- 1 older age.
- 2 Heavy alcohol use .
- 3 Smoking.
- 4 obesity.
- 5 High blood pressure .
- 6 previous eye injuries .
- 7 A family history of cataracts .
- 8 Too much Sun exposure .
- 9 Diabetes .
- 10 exposure to radiation From X-rays and Cancer treatments.

## Out looks of cataract

Cataracts can interfere with daily activities and lead to blindness when left untreated. Although some stop growing, they don't get smaller on their own.

The surgical removal of cataracts is a very common procedure and is highly effective roughly (90) percent of the time, according to the national eye institute.

## Prevention of Cataracts

To reduce your risk of developing cataracts:

- 1 protect your eyes from UV B rays by wearing sunglasses outside.
- 2 Have regular eye exams.
- 3 stop Smoking.
- 4 eat fruits and vegetables that contain antioxidants.
- 5 maintain a healthy weight.
- 6 Keep diabetes and other medical conditions.

## Types of cataracts

There are different types of cataracts they are classified based on where and how they develop in your eye.

### 1 Nuclear cataracts :

Form in the middle of the lens and cause the nucleus, or the center, to become yellow or brown.

### 2 Cortical cataracts :

are wedge shaped and form around the edges of the nucleus.

### 3 Posterior capsular cataracts :

Form faster than the other two types and affect the back of the lens.

### 4 Congenital cataracts:

which are present at birth or form during a baby's first year, are less common than age related cataracts.

### 5 Secondary cataracts :

are caused by disease or medication. Diseases that are linked with the development of cataracts include glaucoma and diabetes. The use of the steroid prednisone and other medications can sometimes lead to cataracts.

### 6 Traumatic cataracts:

develop after an injury to the eye, but it can take several years for this to happen.

### 7 Radiation cataracts :

can form after a person undergoes radiation treatment for cancer.

## Treatment of Cataracts

Treatment of cataract is surgical removal of the Cataractous lens. There are two types of Surgery.

### 1. old method "ECCE" :

Extra capsular Cataract extraction .

### 2. New method a "Phaco" :

Phaco Emulsification

	ECCE 1	Phaco 2
1. anesthesia	General anesthesia	Local anesthesia (eye drop)
2. time	30 minutes	5 - 15 minutes
3. incision	Large (10 - 12mm)	Small (2 - 3mm)
4. I.O.L	In flexible material "PMMA"	Flexible material "foldable"
5. convalescing	2 - 3 weeks	Almost one week
6. refractive error	There is a refractive error astigmatism $\times 30$ .	Refractive error is few
7. V.A	Almost 6/24, 6/12	Almost 6/6

Thank  
you!



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د. أحمد شاكر شناوه  
أخصائي طب وجراحة العيون

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6. refractive error	There is a refractive error astigmatism $\times 30$ .	Refractive error is few
7. V.A	Almost 6/24, 6/12	Almost 6/6

Thank  
you!

# Aphakia

فحص بصر م 2



# Aphakia

- It is the absence or removal of the lens from the eye.
- Aphakia is a condition that involves not having an eye lens. The lens of your eye is a clear, flexible structure that allows your eye to focus,
- This Condition is most common in adults with Cataracts, but it can also affect infants and children.



# Causes of aphakia

1. **Congenital aphakia** – genetic causes or infections like rubella.
2. **Surgical aphakia** – removal of lens as in cataract extraction surgery.
3. **Aphakia due to absorption of lens** – usually seen in children after trauma
4. **Traumatic extrusion of lens.**
5. **Posterior dislocation of lens** into the vitreous causes optical aphakia.

# Congenital aphakia

genetic causes or infections like rubella



# Surgical aphakia

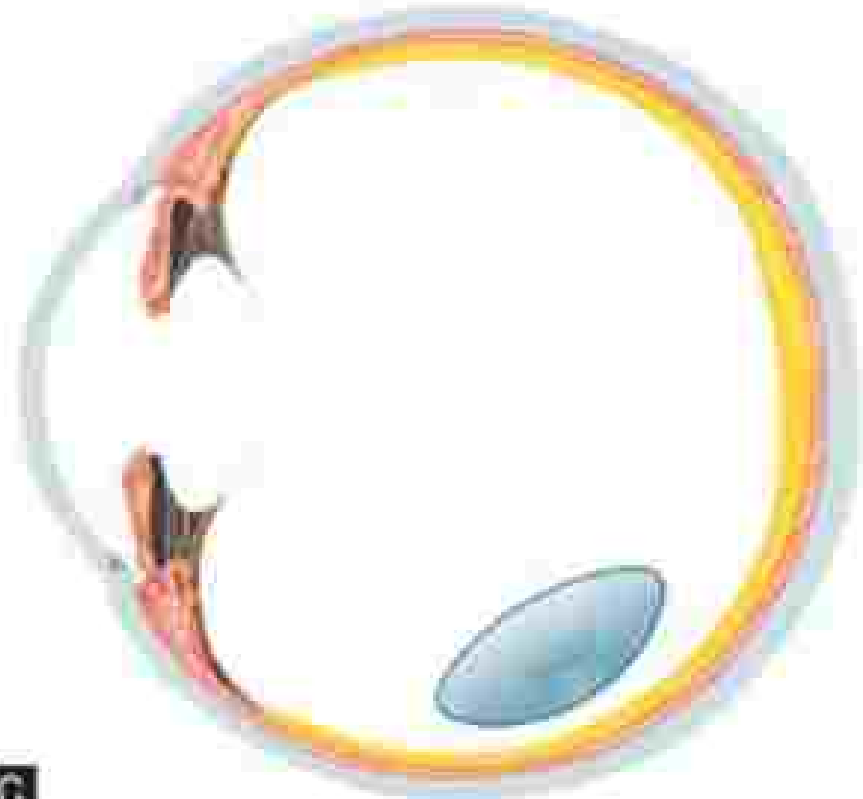
removal of lens as in cataract extraction surgery



# Traumatic extrusion of lens



# Posterior dislocation of lens into the vitreous causes optical aphakia



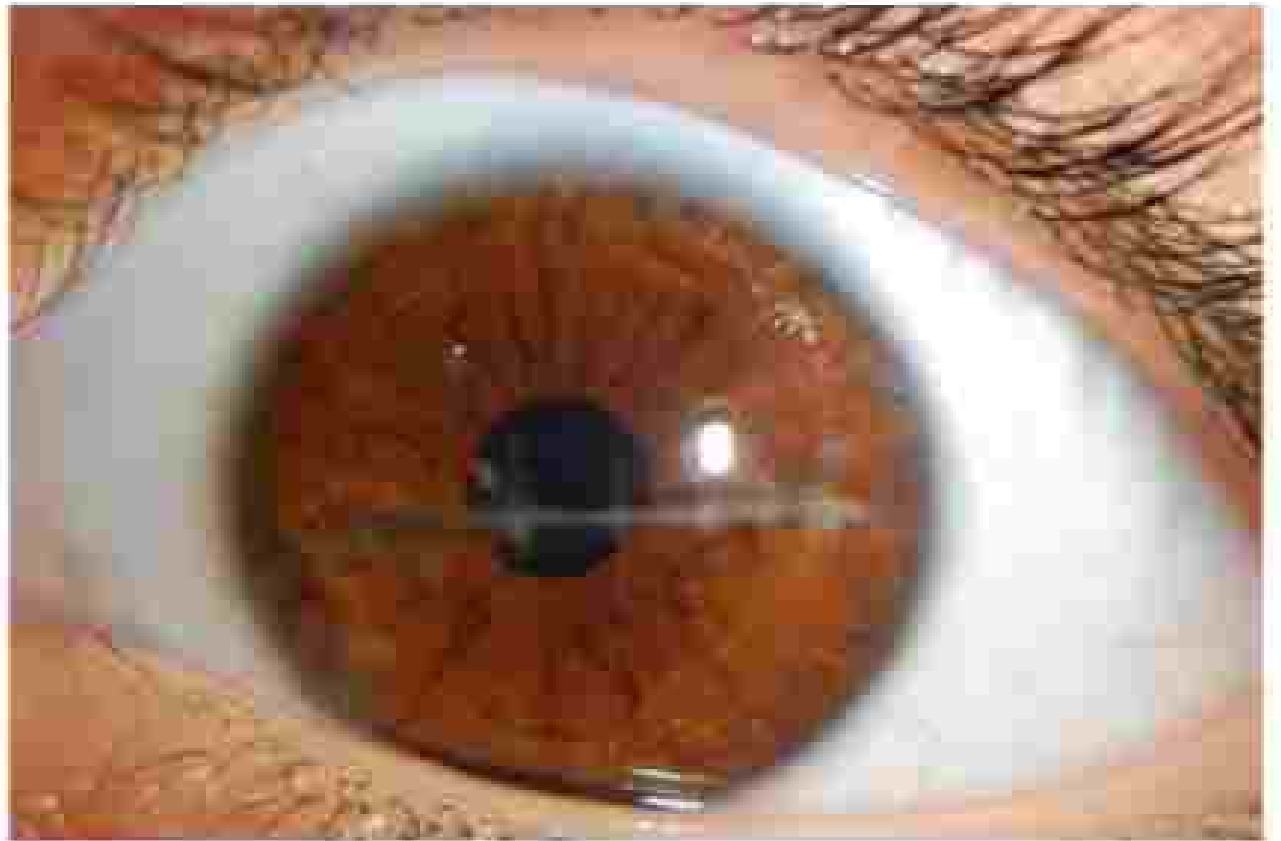
# Symptoms

- **Defective far vision:** because of high hypermetropia.
- **Defective near vision:** due to loss of accommodation.

# Signs

## 1- Cornea:

- Scar of cataract surgery
- Scar of ruptured globe

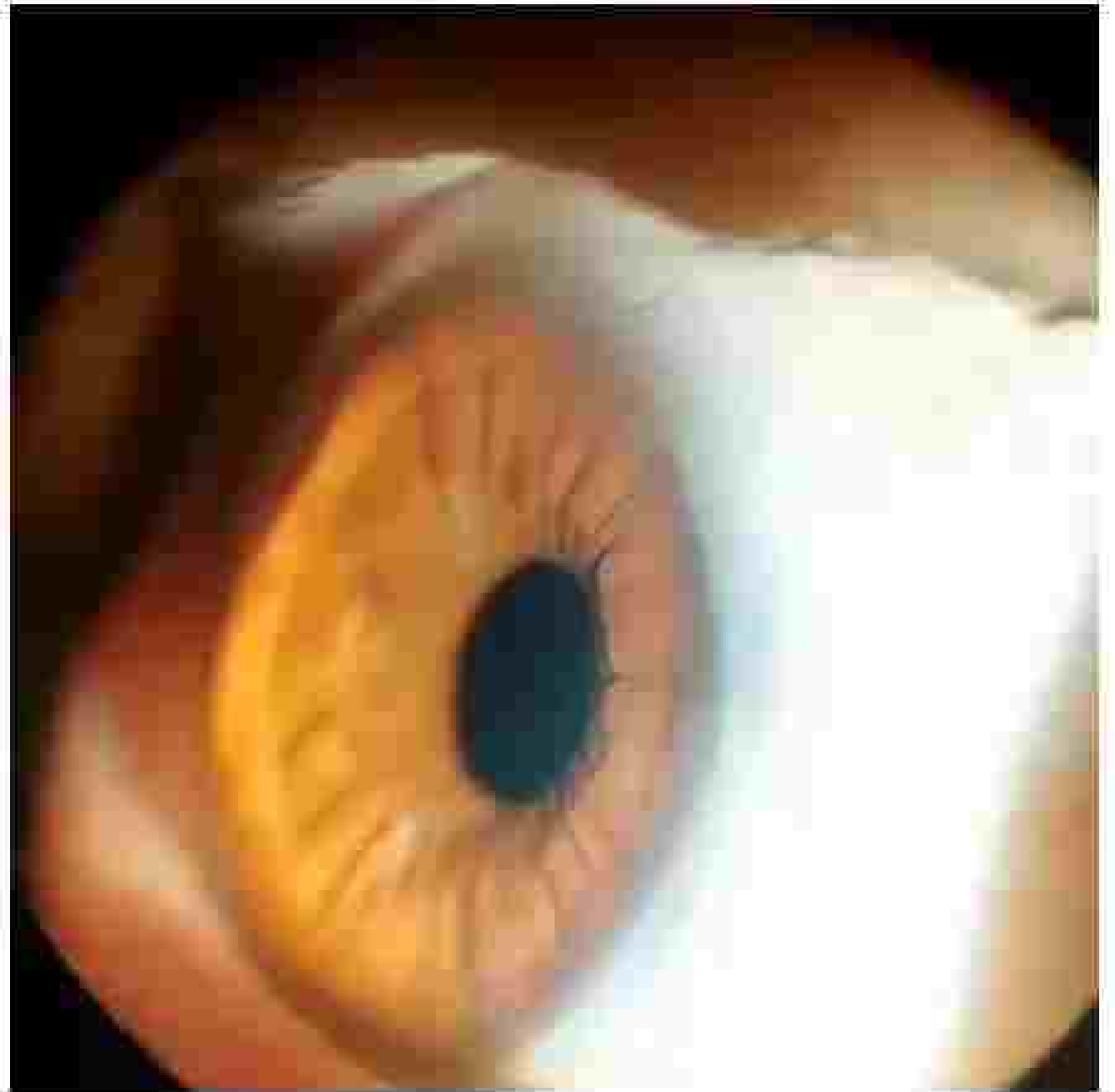




# Signs

## 2- Iris:

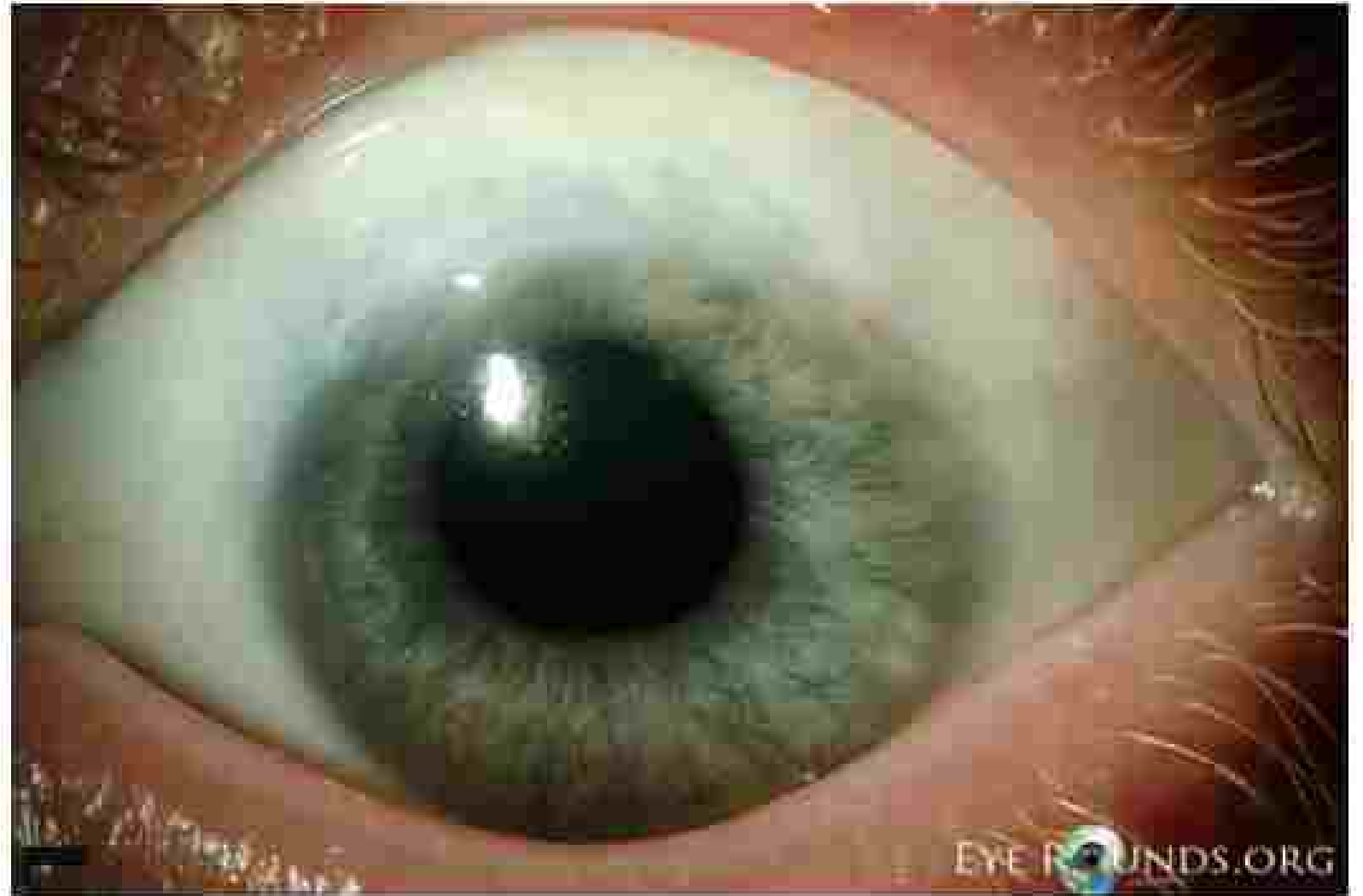
- Tremulous (Loss of support by the lens), **Iridodonesis**



# Signs

## 3- Pupil:

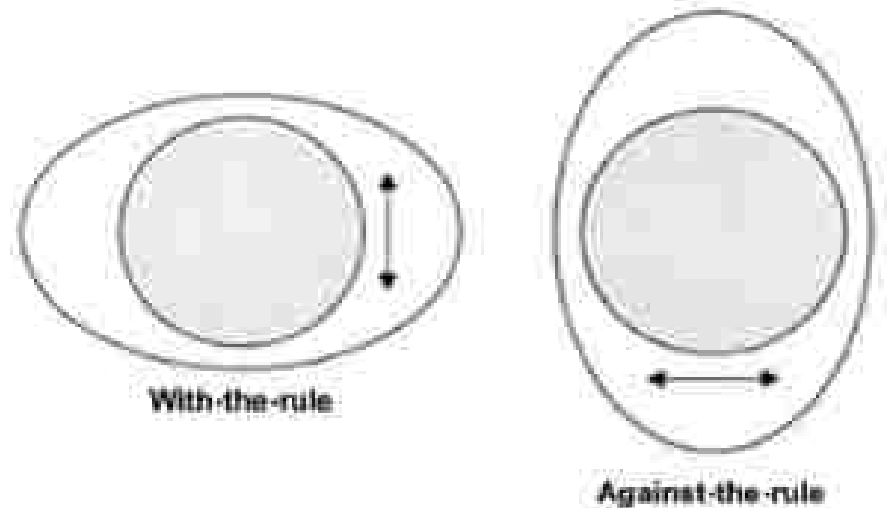
- Jet black color



# Signs

## 4- Refraction:

- High hypermetropia (+10 D or more)
- Astigmatism against the rule (because of the corneal scar after surgery)
- Anisometropia (in unilateral aphakia)



# Treatment (Visual rehabilitation)

## 1- Glasses (Convex lenses)

- In bilateral aphakia
- Prescribe separate glasses for distant and near correction or use bifocals or PALs.

## 2- Contact lenses (Convex lenses)

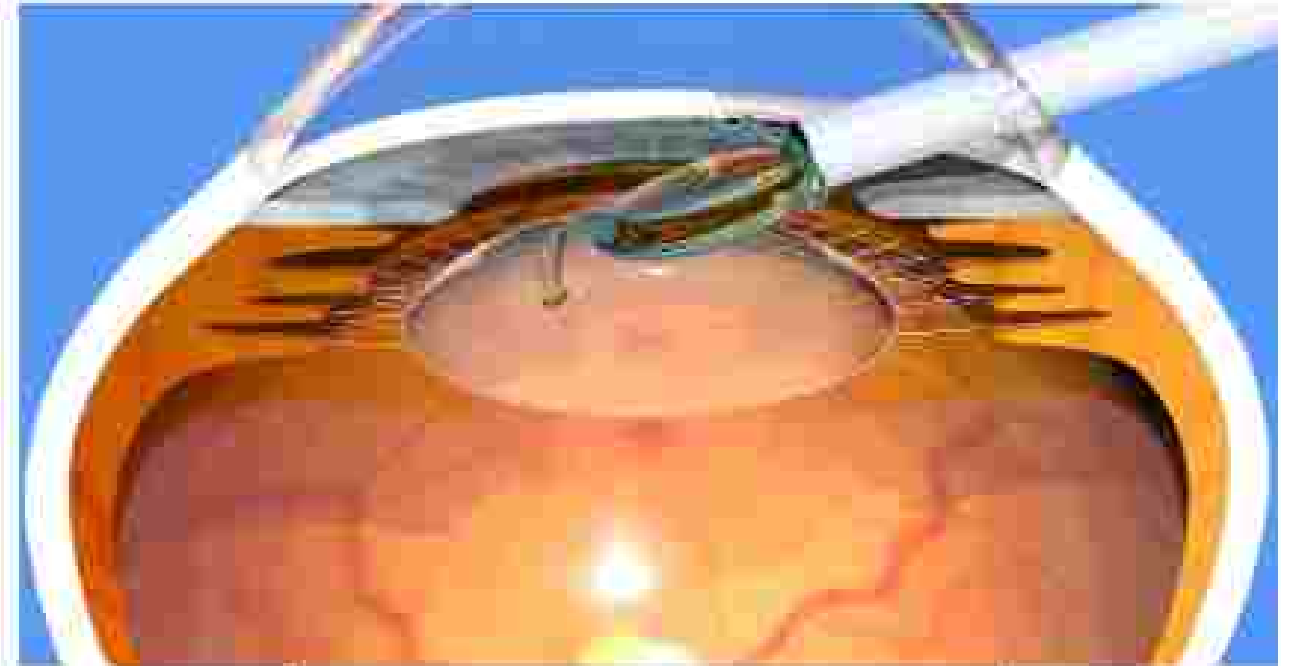
- In bilateral or unilateral aphakia
- Prescribe bifocal lenses, or monogonol lenses with reading glasses



# Treatment (Visual rehabilitation)

## 3- IOL (intraocular lens)

- It is the best option (Least image magnification)
- Might be used in unilateral or bilateral
- Implant monofocal IOLs with additional reading glasses, or implant multifocal IOL.

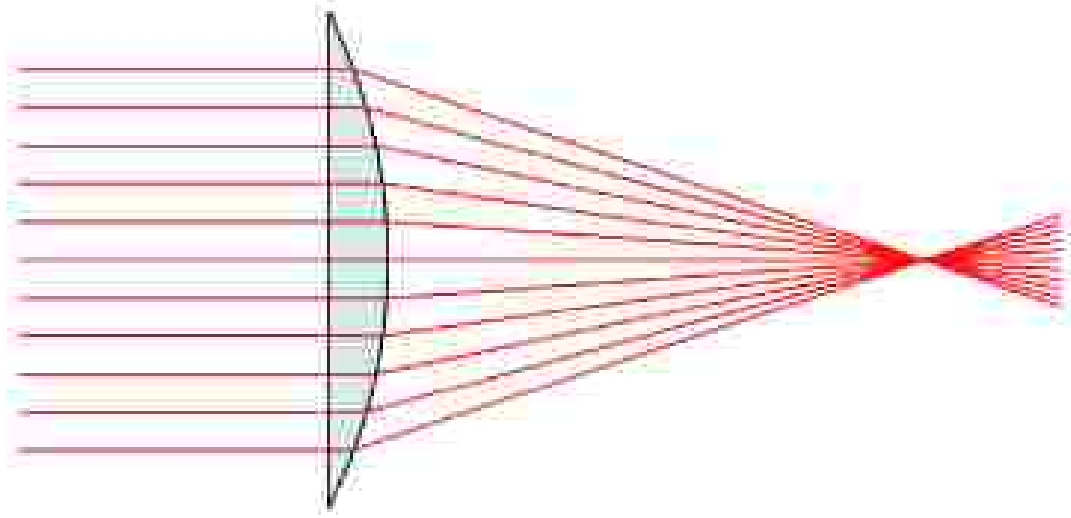


# Notes

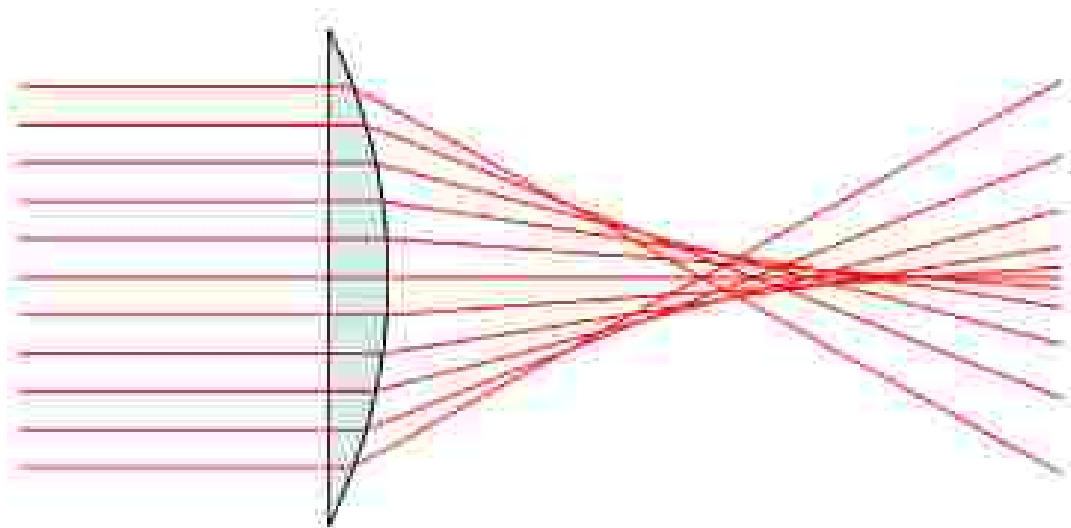
- Reading ADD in aphakic eye is + 3D (Accommodation is lost)
- Disadvantage of glasses in correction of aphakia:
  - 1- Image magnification (about 33%)
  - 2- Peripheral aberration
  - 3- Visual field constriction
  - 4- Thick heavy lenses with poor cosmetic



# Peripheral aberration and Visual field constriction



Full Vision Field (Normal)



Thick heavy lenses with poor cosmetic





# Complications related to aphakia:

## ① Aphakia glaucoma :

- Having any kind of eye Surgery can increase your risk of developing glaucoma.
- This happens when building press are inside the eye damages your optic nerve.
- If left untreated, glaucoma Can lead to vision loss After having any Kind of eye Surgery, make Sure you follow up with regular eye exams to check for glaucoma .

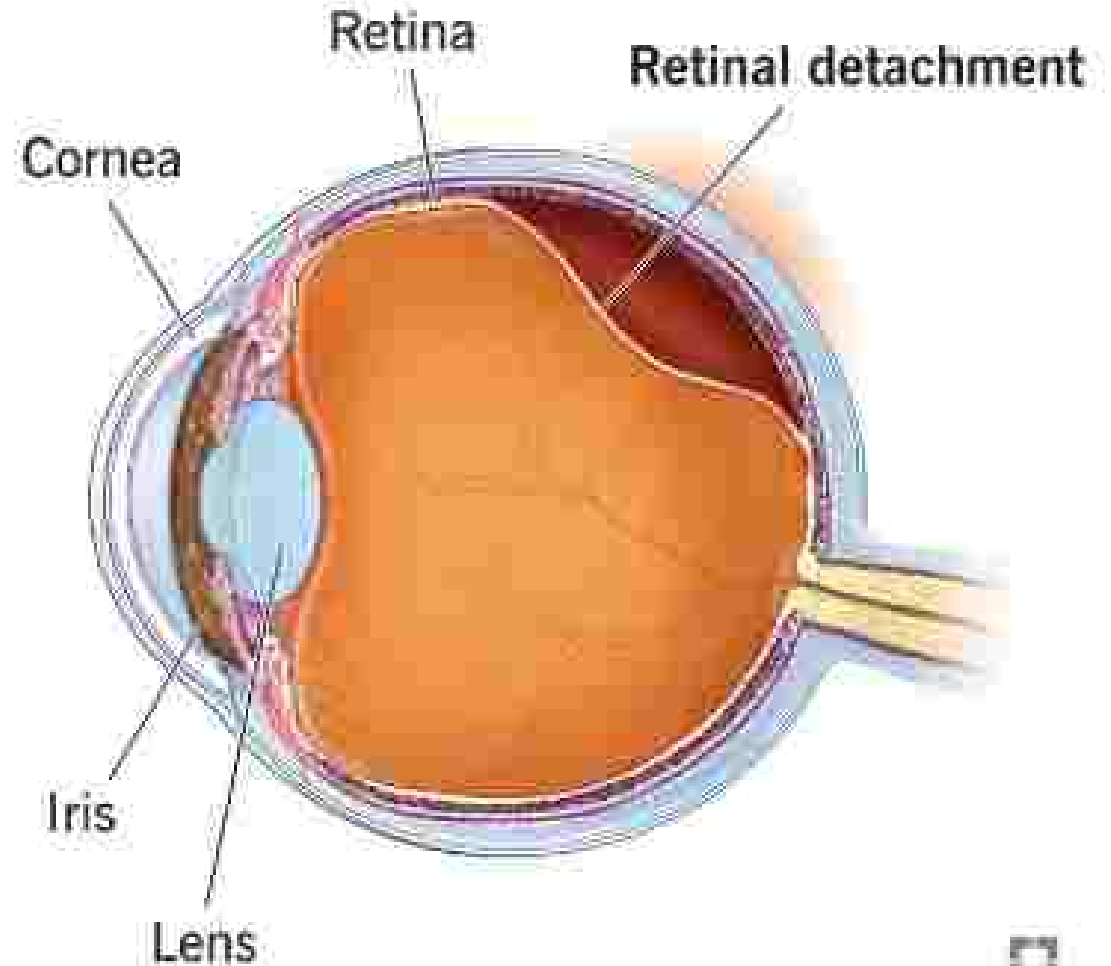


# Complications

## 2 Retinal detachment :

- People who have eye injuries or surgery also have a higher risk of developing a detached retina.
- The retina has visual receptors that change images into electrical impulses, which are sent to the brain.
- Sometimes the retina detaches can pulls away from the tissue that, holds it in place.

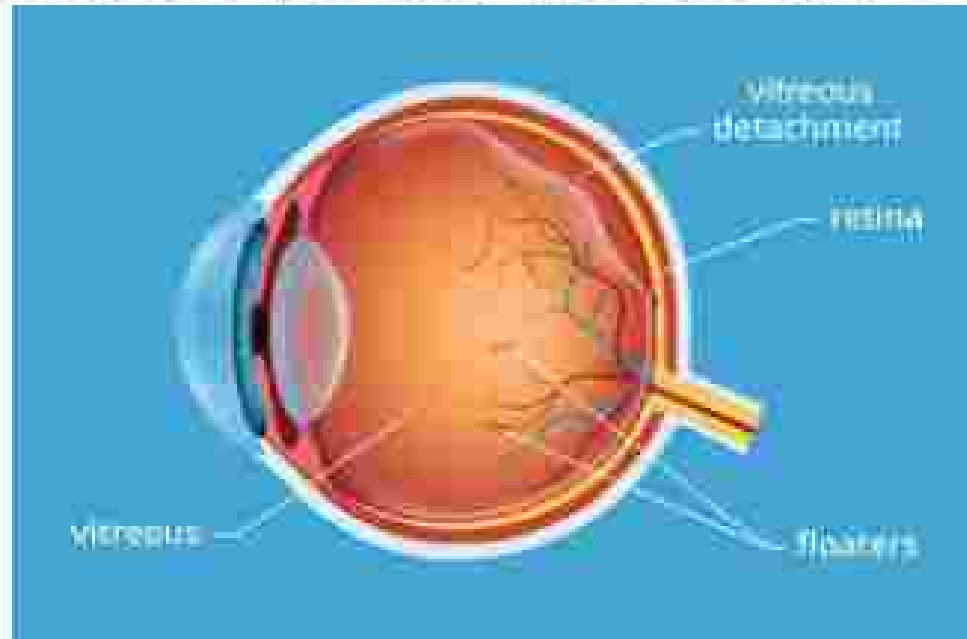
## Retinal detachment



# Complications

## ③ vitreous detachment :

- The vitreous humor is a gel-like substance that fills the inside of your eye and is attached to the retina.
- Both aging and eye surgery can cause changes in the vitreous humor.
- These changes may cause it to pull away from the retina resulting in a vitreous detachment.





# **Refractive errors in children**

# Objectives

- *Testing in preverbal children*
- *Testing in verbal children*
- Refraction and funduscopy
- Cycloplegia
- Change of refraction with age in childhood
- When to prescribe

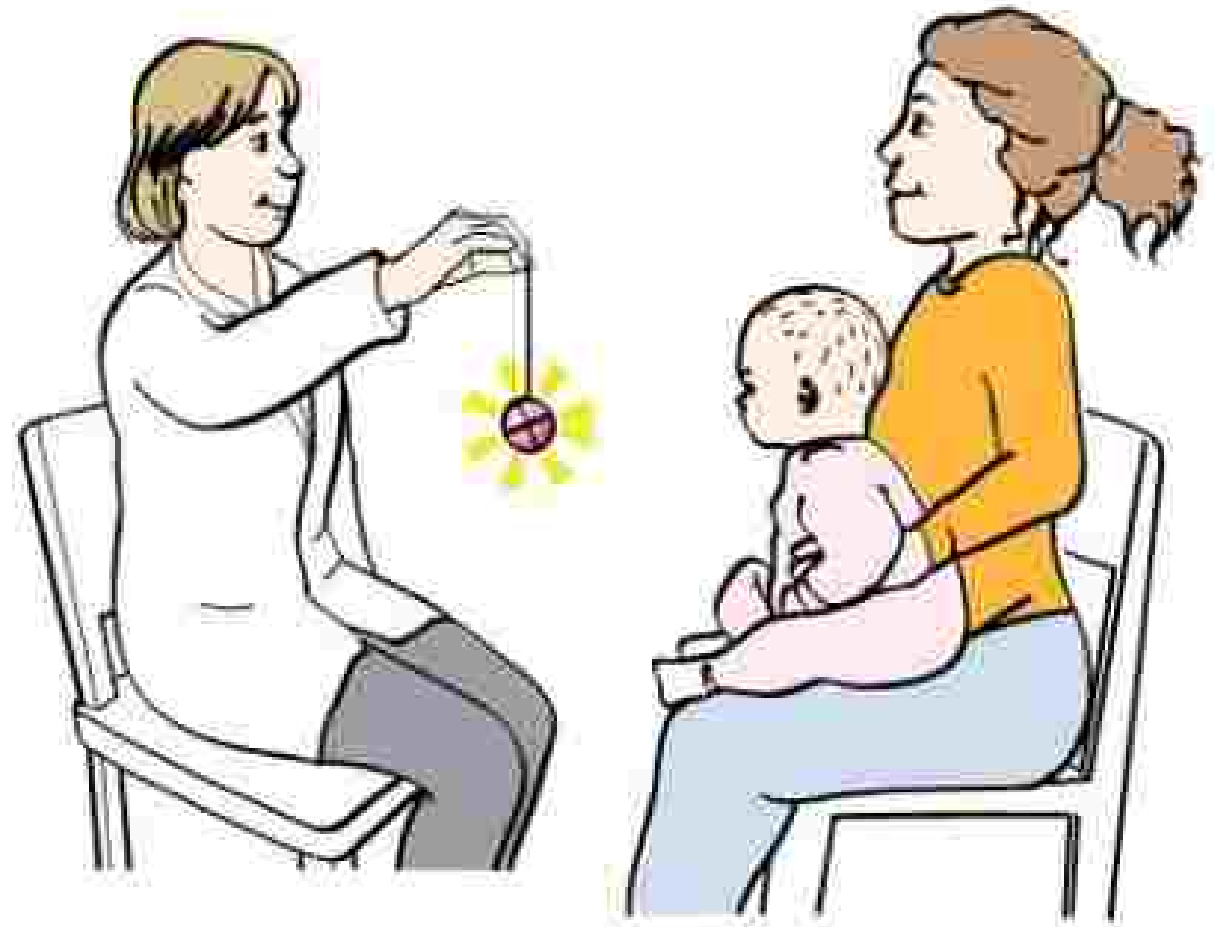
## *Testing in preverbal children*

Assessment of visual behaviour is achieved as follows:

1. Fixation and following
2. Comparison between the behaviour of the two eyes
3. Fixation behaviour
4. The 10  $\Delta$  test
5. Rotation test
6. Preferential looking tests
7. Pattern visual evoked potentials (VEP)

# 1- Fixation and following

- **Fixation and following** may be assessed using bright attention-grabbing targets (a face is often best). This method indicates whether the infant is visually alert and is of particular value in a child suspected of being blind.



## 2- Comparison between the behaviour of the two eyes

- **Comparison** between the behaviour of the two eyes may reveal a unilateral preference. Occlusion of one eye, if strongly objected to by the child, indicates poorer acuity in the other eye.





## 3- Fixation behaviour

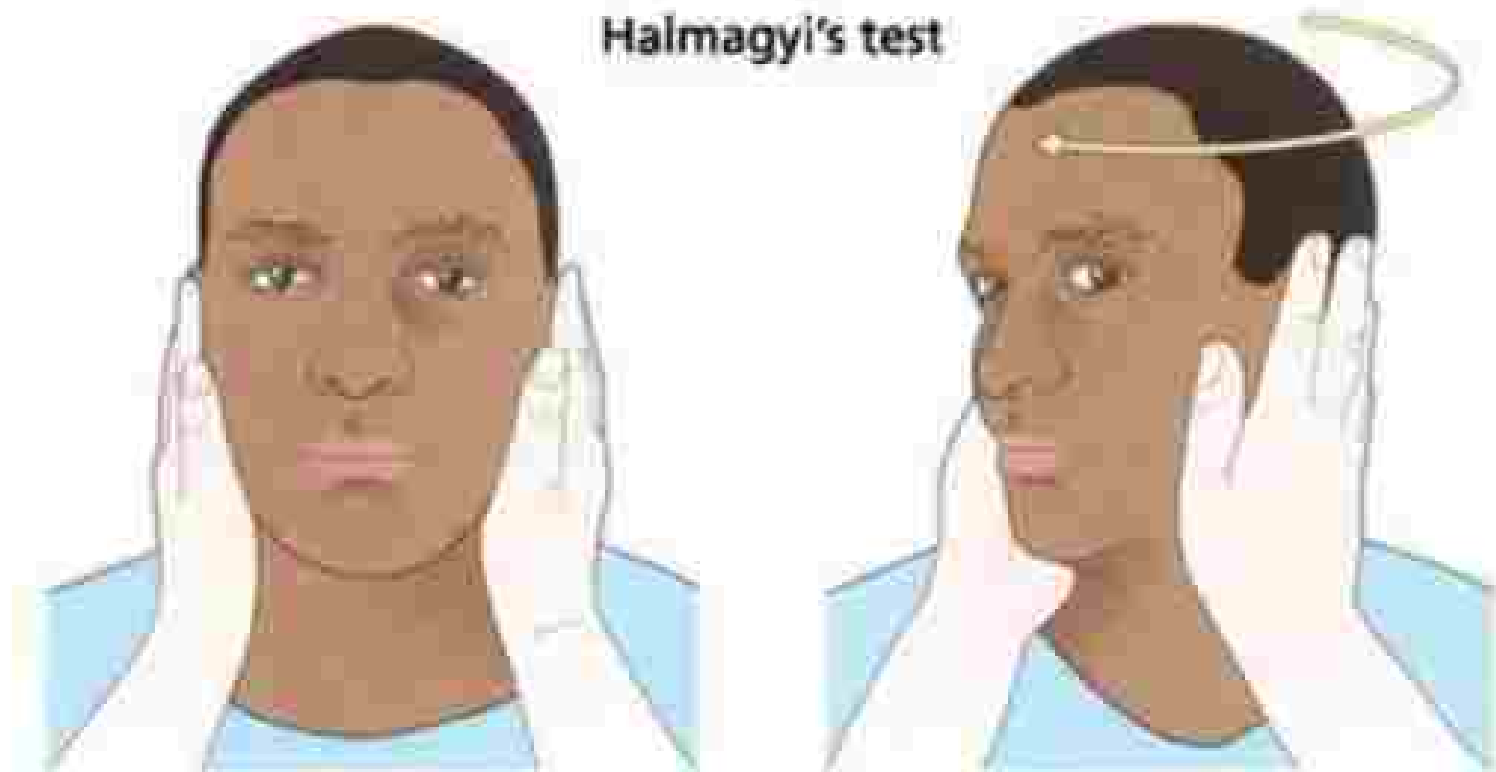
- **Fixation behaviour can be used to establish unilateral preference if a manifest squint is present.**
- Fixation is promoted in the squinting eye by occluding the dominant eye while the child fixates a target of interest (preferably incorporating a light).
- Fixation is then graded as **central or non-central and steady or unsteady** (the corneal reflection can be observed).
- The other eye is then uncovered and the ability to maintain fixation is observed.
- If fixation immediately returns to the uncovered eye, then visual acuity is probably impaired.
- If fixation is maintained through a blink, then visual acuity is probably good.
- If the patient alternates fixation, then the two eyes probably have equal vision.

## 4- The 10 $\Delta$ test

- **The 10  $\Delta$  test** is similar and can be used regardless of whether a manifest squint is present. It involves the promotion of diplopia using a 10  $\Delta$  vertical prism. Alternation between the diplopic targets suggests equal visual acuity.

## 5- Rotation test

- **Rotation test** is a gross qualitative test of the ability of an infant to fixate with both eyes open.



- The examiner holds the child facing him or her and rotates briskly through 360°.
- If vision is normal, the eyes will deviate in the direction of rotation under the influence of the vestibulo-ocular response.

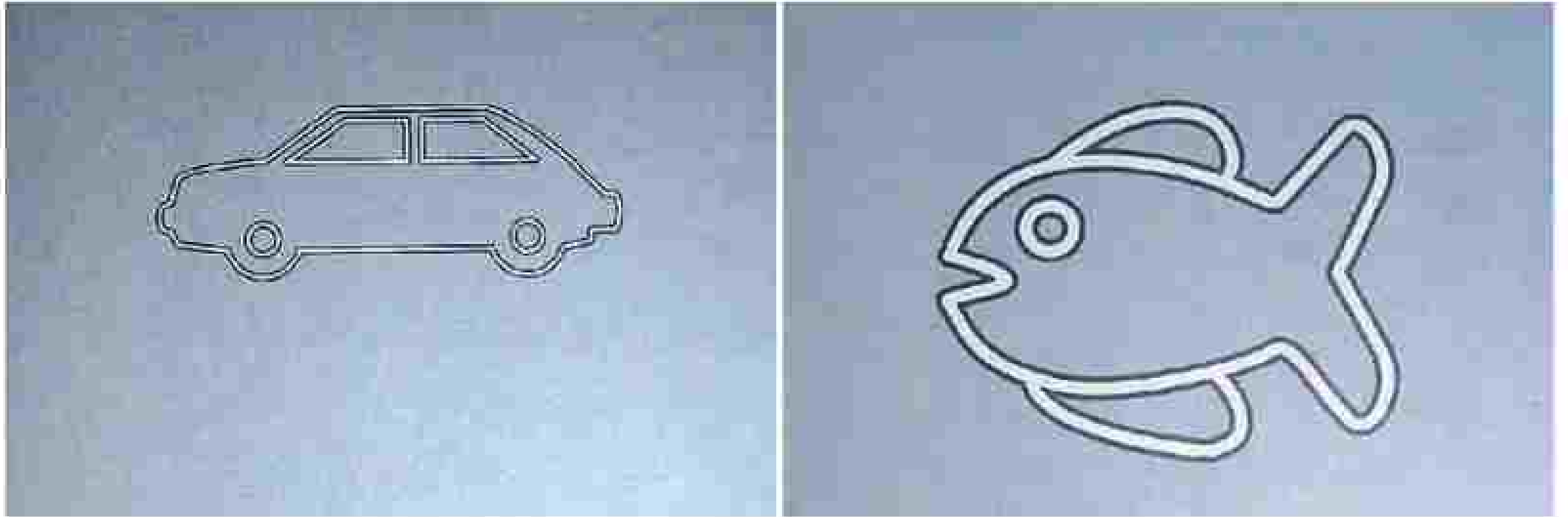
- The eyes flick back to the primary position to produce a rotational nystagmus.
- When rotation stops, nystagmus is briefly observed in the opposite direction for 1–2 seconds and should then cease due to suppression of post-rotary nystagmus by fixation.
- If vision is severely impaired, the post-rotation nystagmus does not stop as quickly when rotation ceases because the vestibulo-ocular response is not blocked by visual feedback.

## 6- Preferential looking tests

- Can be used from early infancy and are based on the fact that infants prefer to look at a pattern rather than a homogeneous stimulus.
- The infant is exposed to a stimulus and the examiner observes the eyes for fixation movements, without themselves knowing the stimulus position.



1. Tests in common use include the **Teller and Keeler acuity cards**, which consist of black stripes (gratings) of varying widths.



2. And Cardiff acuity cards, which consist of familiar pictures with variable outline width.

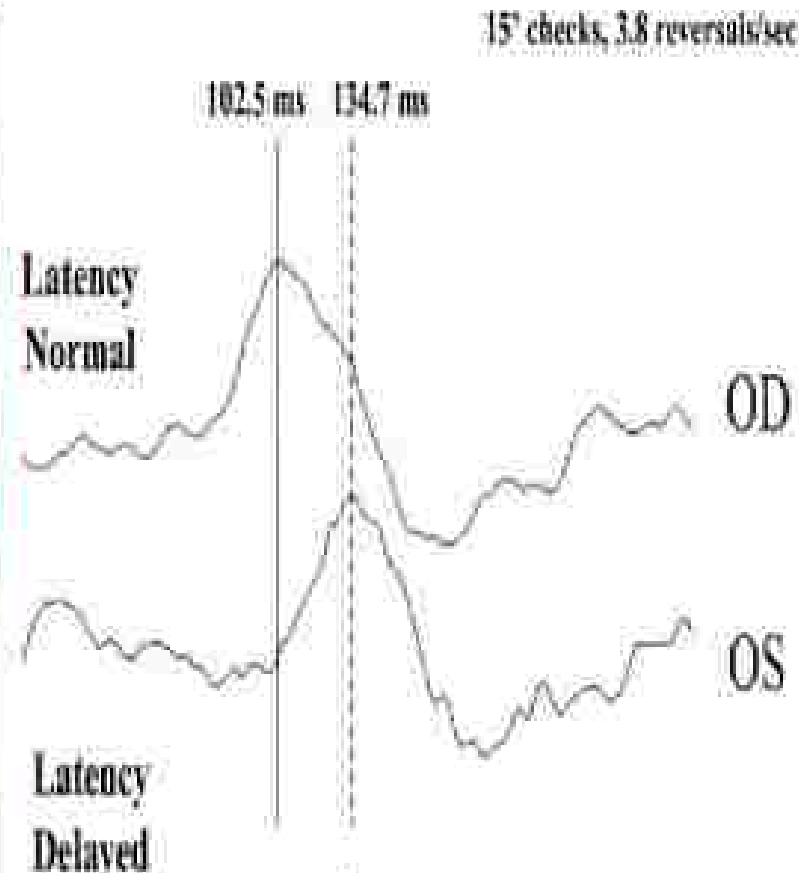


# 7- Pattern visual evoked potentials (VEP)

- give a representation of spatial acuity but are more commonly used in the diagnosis of optic neuropathy.

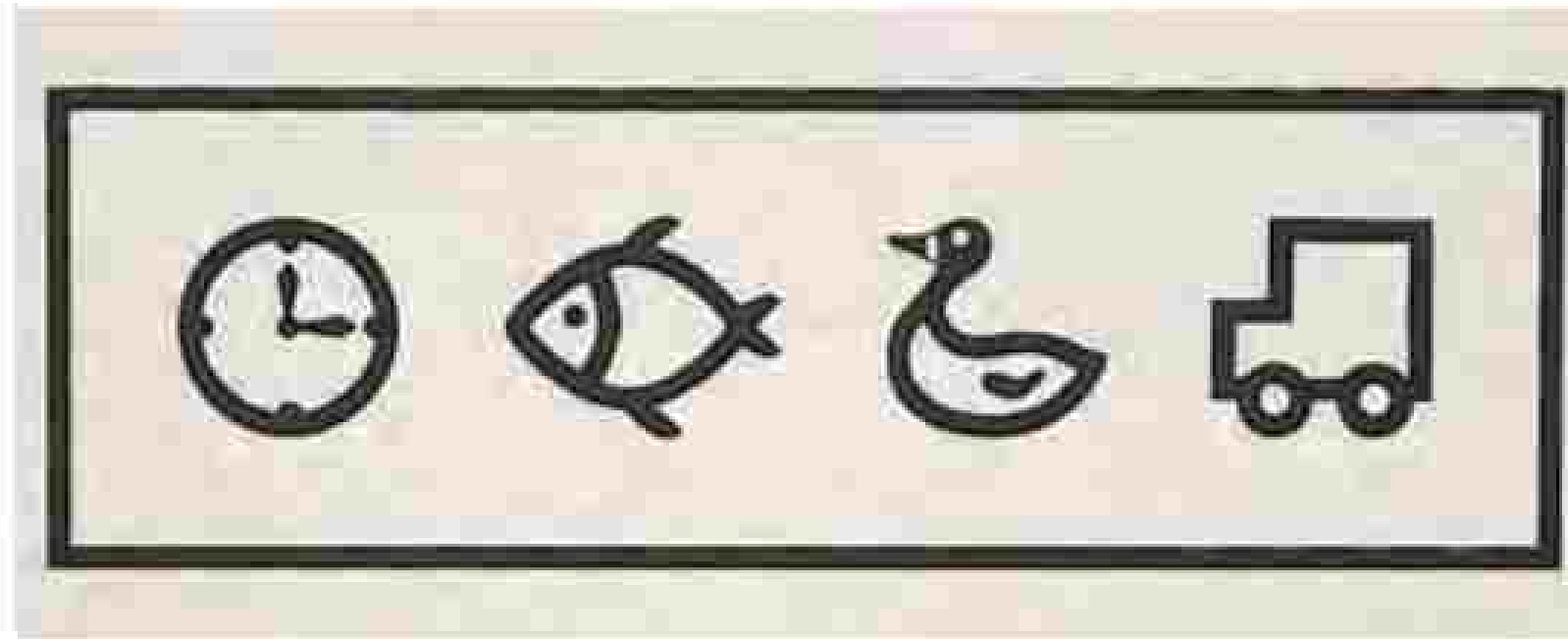


97% sensitivity in detecting visual deficits where they exist and a 94% completion rate amongst even the youngest of children.



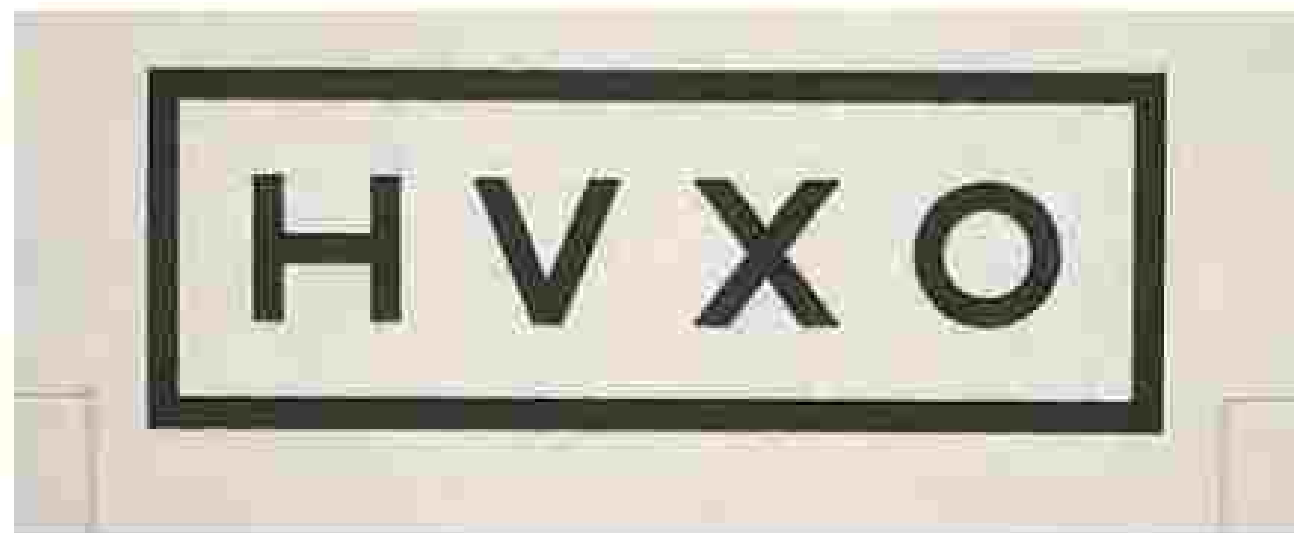
## *Testing in verbal children*

- **At age 2 years** most children will have sufficient language skills to undertake a picture naming test such as the crowded Kay pictures.



*Kay pictures*

- **At age 3 years** most children will be able to undertake the matching of letter optotypes as in the Keeler logMAR or Sonksen crowded tests. If a crowded letter test proves too difficult it is preferable to perform the crowded Kay pictures than to use single optotype letters.



*Keeler logMAR crowded test*

- **Older children** may continue with the crowded letter tests, naming or matching them; LogMAR tests are in common usage and are preferable to Snellen for all children at risk of amblyopia.
- should be performed at 3–4 metres from the target, as it is easier to obtain compliance than at 6 metres.

# Refraction and fundoscopy

- Dilated fundoscopy is mandatory in the context of strabismus, principally to exclude any underlying ocular pathology.
- More commonly, strabismus is secondary to refractive error; hypermetropia (hyperopia), astigmatism, anisometropia and myopia may all be associated.



- The most common refractive error to cause strabismus is hypermetropia.
- Accurate measurements of hypermetropia necessitate effective paralysis of the ciliary muscle (cycloplegia), in order to neutralize the masking effect of accommodation.
- In a young child the risk of penalization amblyopia should be avoided by always inducing cycloplegia in both eyes at one sitting, particularly if atropine is used.

# Cycloplegia

1. **Cyclopentolate** (0.5% under 6 months and 1% subsequently). One drop, repeated after 5 minutes, usually results in maximal cycloplegia within 30 minutes, with recovery of accommodation within 2–3 hours and resolution of mydriasis within 24 hours.
  - The adequacy of cycloplegia can be determined by comparing retinoscopy readings with the patient fixating for distance and then for near.
  - Topical anaesthesia with a well-tolerated agent such as proxymetacaine prior to instillation of cyclopentolate is useful in preventing ocular irritation and reflex tearing, thus affording better retention of the cyclopentolate in the conjunctival sac and effective cycloplegia.

- 2. Atropine** (0.5% under the age of 12 months and 1% subsequently) has a somewhat stronger cycloplegic effect than cyclopentolate.
- In most cases this is clinically insignificant, but may be helpful in instances such as high hypermetropia or heavily pigmented irides.
  - As the onset of cycloplegia is slower, a carer may be supplied with topical atropine for instillation at home twice daily over 1–3 days prior to attendance (but not on the day of examination) as either eye drops or ointment; drops are easier to instil, but there may be less risk of overdose with ointment.
  - The atropine should be discontinued if there are signs of systemic toxicity, such as flushing, fever or restlessness, and immediate medical attention sought. The visual effects may last for up to 2 weeks.





Cyclopentolate



Atropine

## *Change of refraction with age in childhood*

- Because refraction changes with age, it is important to check this in patients with strabismus at least **every year** and more frequently in younger children and if acuity is reduced.
- At birth most babies are hypermetropic. After the age of 2 years there may be an increase in hypermetropia and a decrease in astigmatism. Hypermetropia may continue to increase until the age of about 6 years, levelling off between the ages of 6 and 8 and subsequently decreasing.

## *When to prescribe*

- Most children are mildly hypermetropic (1–3 D). There is some evidence that fully correcting hypermetropia in a normal child may reduce physiological emmetropization.



- **Hypermetropia:** In general up to 4 D of hypermetropia should not be corrected in a child without a squint unless they are experiencing problems with near vision.
- With hypermetropia greater than this a two-thirds correction is usually given. However, in the presence of esotropia, the full cycloplegic correction should be prescribed, even under the age of 2 years.
- **Astigmatism:** A cylinder of 1.50 D or more should probably be prescribed, especially in anisometropia after the age of 18 months.

- **Myopia:** The necessity for correction depends on the age of the child. Under the age of 2 years, -5.00 D or more of myopia should be corrected; between the ages of 2 and 4 the amount is -3.00 D. Older children should have correction of even low myopia to allow clear distance vision.
- Under-correction and bifocals may retard progression and are under investigation.
- **Anisometropia:** After the age of 3 the full difference in refraction between the eyes should be prescribed if it is more than 1 D, with full hypermetropic correction in squint.

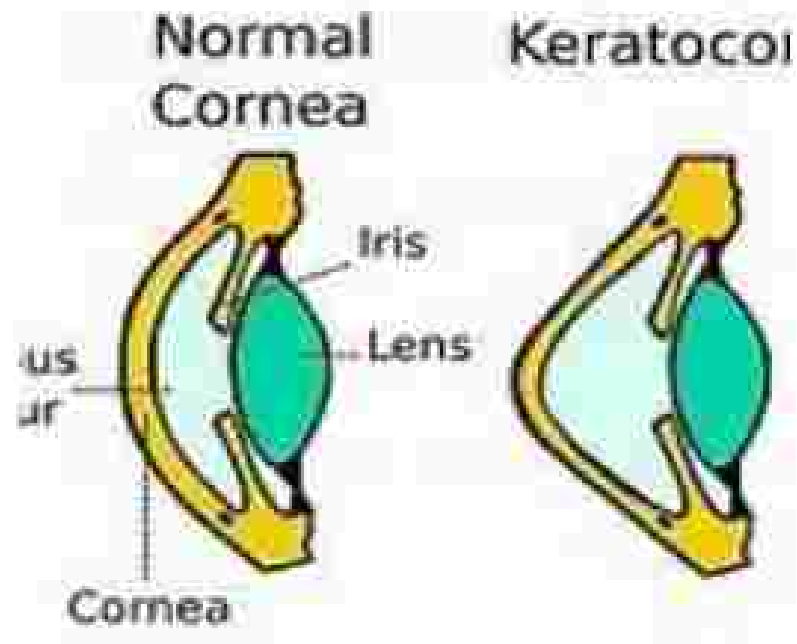
*Thank You!*

Keratoconus

د. احمد شاکر شناوه

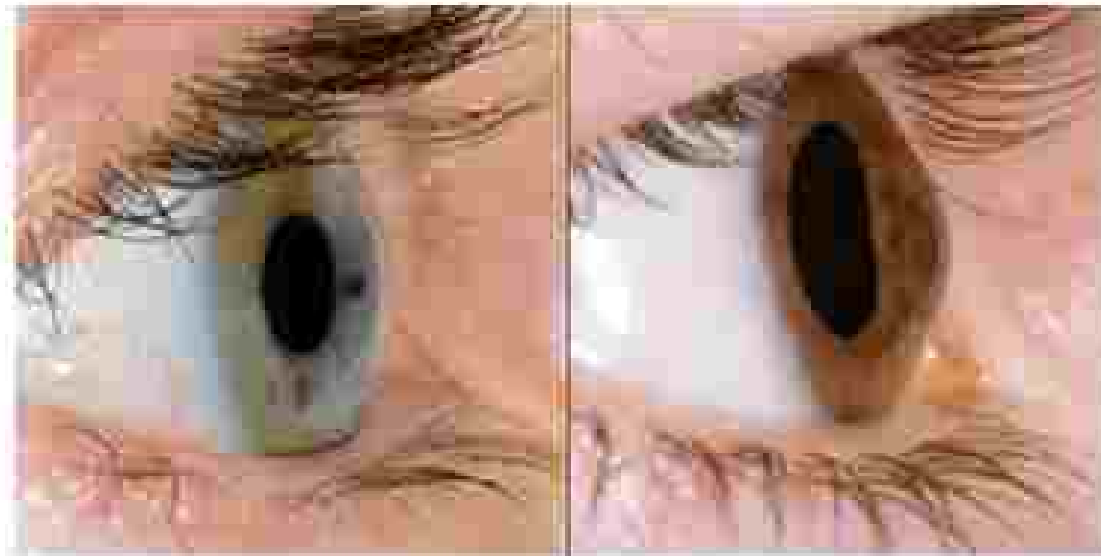
جراح عيون اختصاص

Keratoconus (KC) is a progressive disorder in which central or paracentral corneal stromal thinning occurs, accompanied by apical protrusion and irregular astigmatism.





Approximately 50% of normal fellow eyes will progress to KC within 16 years



Normal Cornea

Keratoconic cornea

Most patients do not have a family history, with only about 10% of offspring developing KC



- Systemic associations include Down, Ehlers–Danlos and Marfan syndromes
- Ocular associations include vernal keratoconjunctivitis, eye rubbing





- **Diagnosis**

- Symptoms. Unilateral impairment of vision due to progressive myopia and astigmatism.

		SPH	CYL.	AXIS	A.V WITHOUT	A.V WITH	B.
FAR	OD	-3.25	-3.5	40	c-f 3m	6/18	
	OS	-2.5	-3.5	120	c-f 3m	6/18	
NEAR	OD						
	OS						

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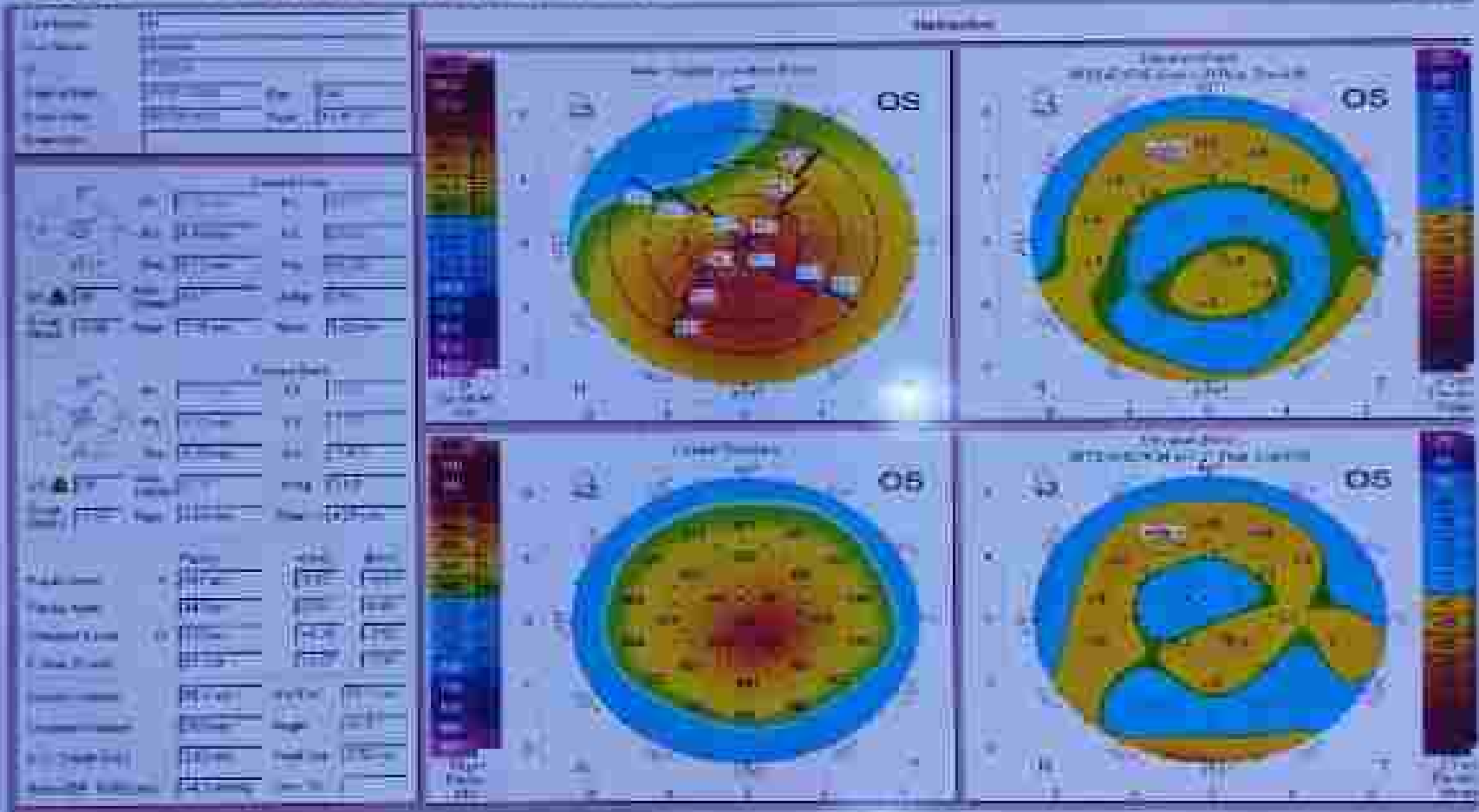
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Occasionally, initial presentation is with acute hydrops (see below).

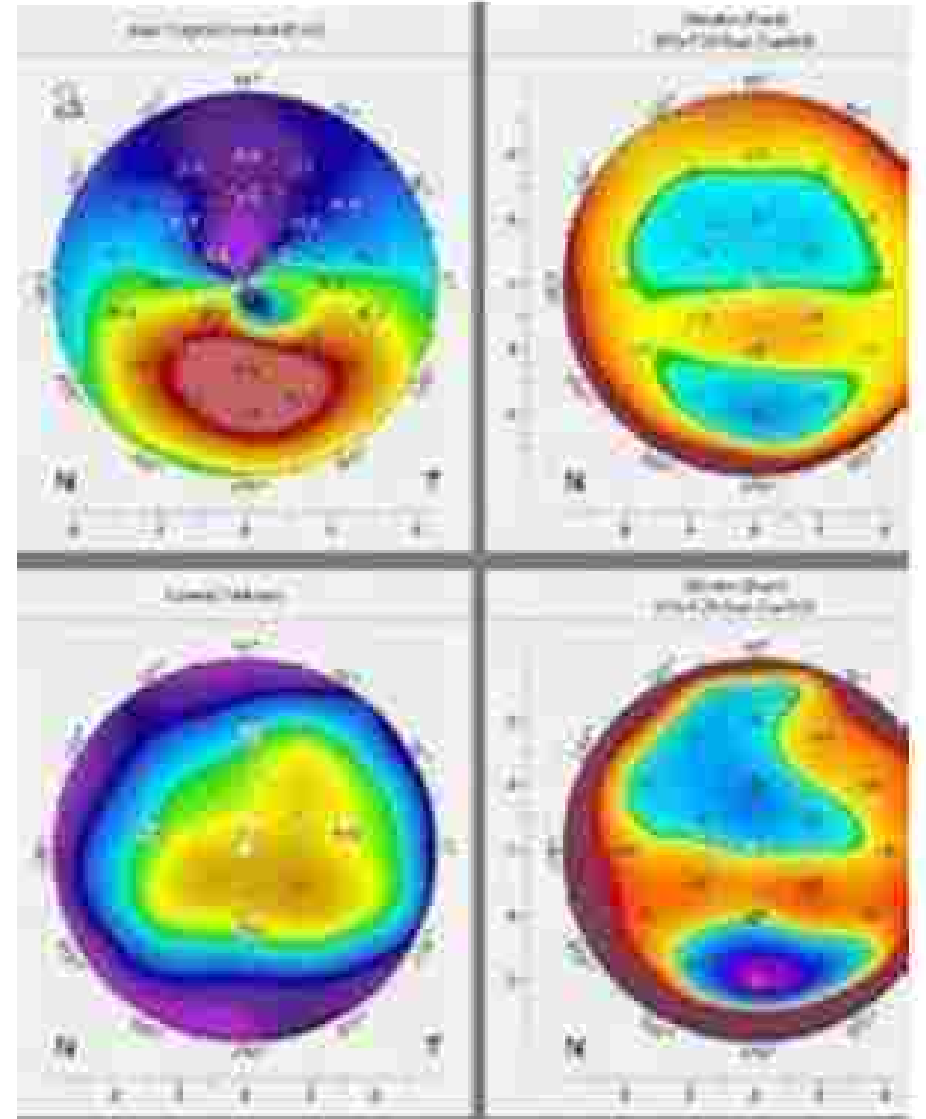


# DX

- Keratometry readings are steep.
- • Corneal topography

A screenshot of a medical report, likely from a corneal topography device. The text is partially obscured but includes the following data points:

Parameter	Value
Corneal Curvature	43.50 D
Horizontal Astigmatism	1.75 D
Vertical Astigmatism	1.75 D
Total Astigmatism	3.50 D
Axis	180°
Axis	90°
Axis	180°
Axis	90°
Axis	180°
Axis	90°
Axis	180°
Axis	90°
Axis	180°
Axis	90°



It can be graded by the highest axis of corneal power on keratometry as

mild (<48 D),

moderate (48–54 D)

severe (>54 D).

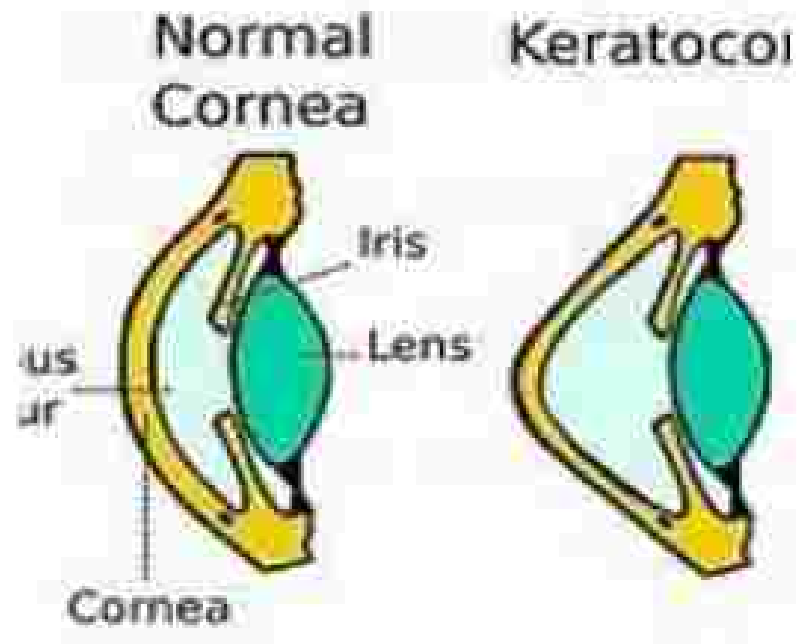
- Treatment
- Eye rubbing should be avoided.
- Spectacles or soft contact lenses are generally sufficient in early cases.
- Rigid contact lenses, sometimes scleral
- Corneal collagen cross-linking (CXL)
- Intracorneal ring segment implantation
- Keratoplasty,

Keratoconus

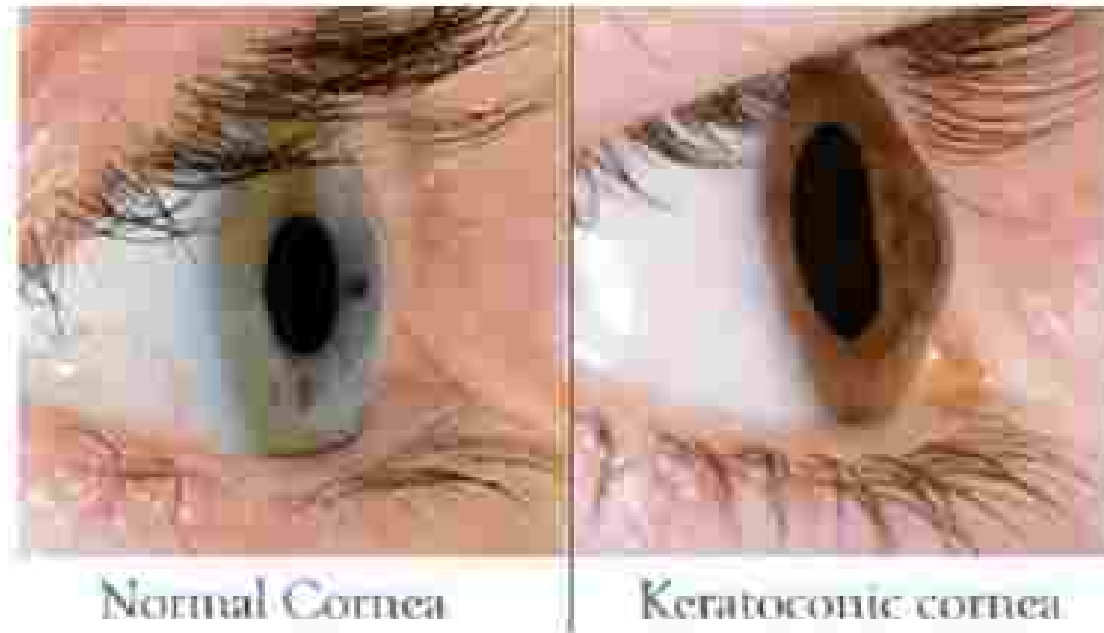
د. احمد شاکر ثناوه

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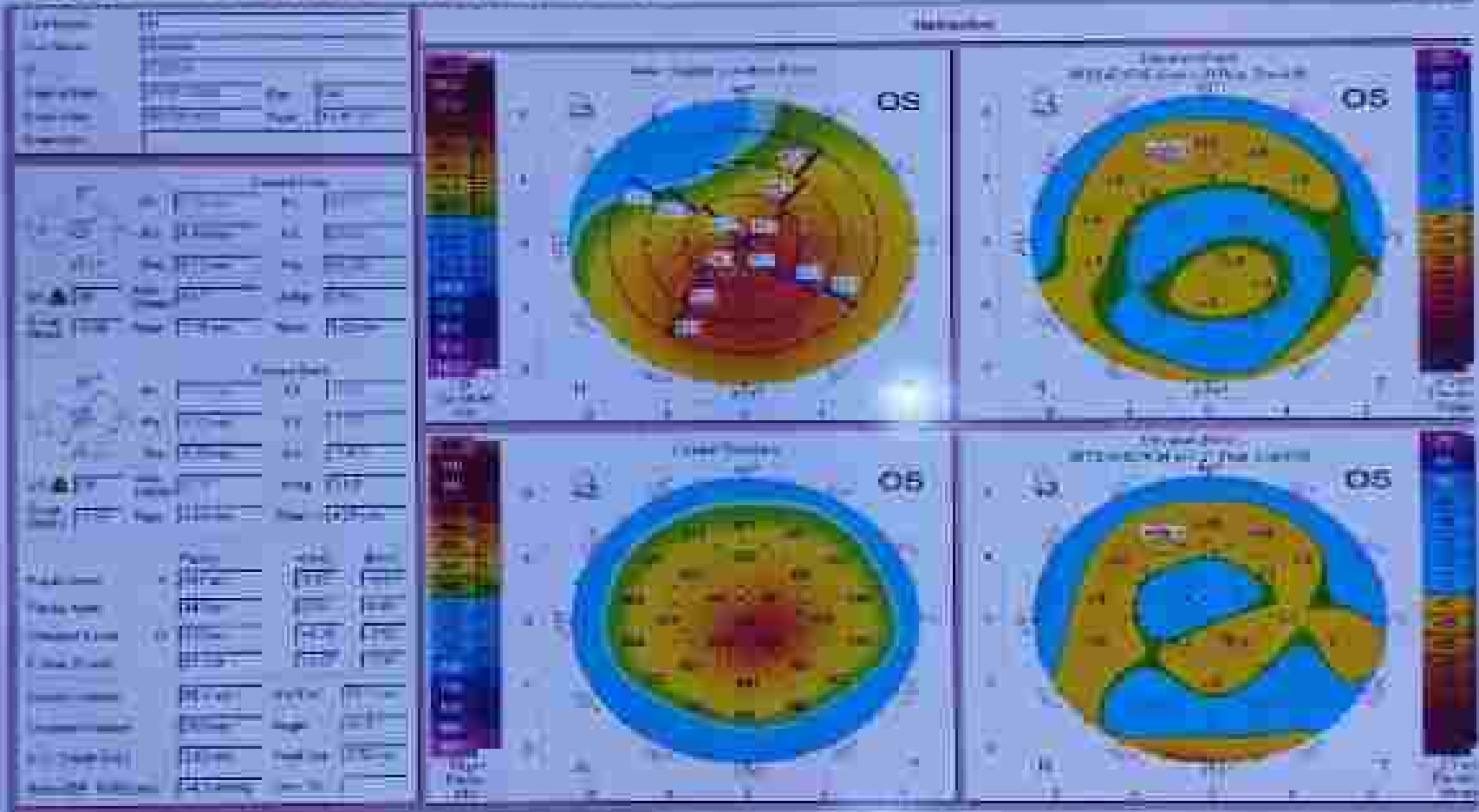
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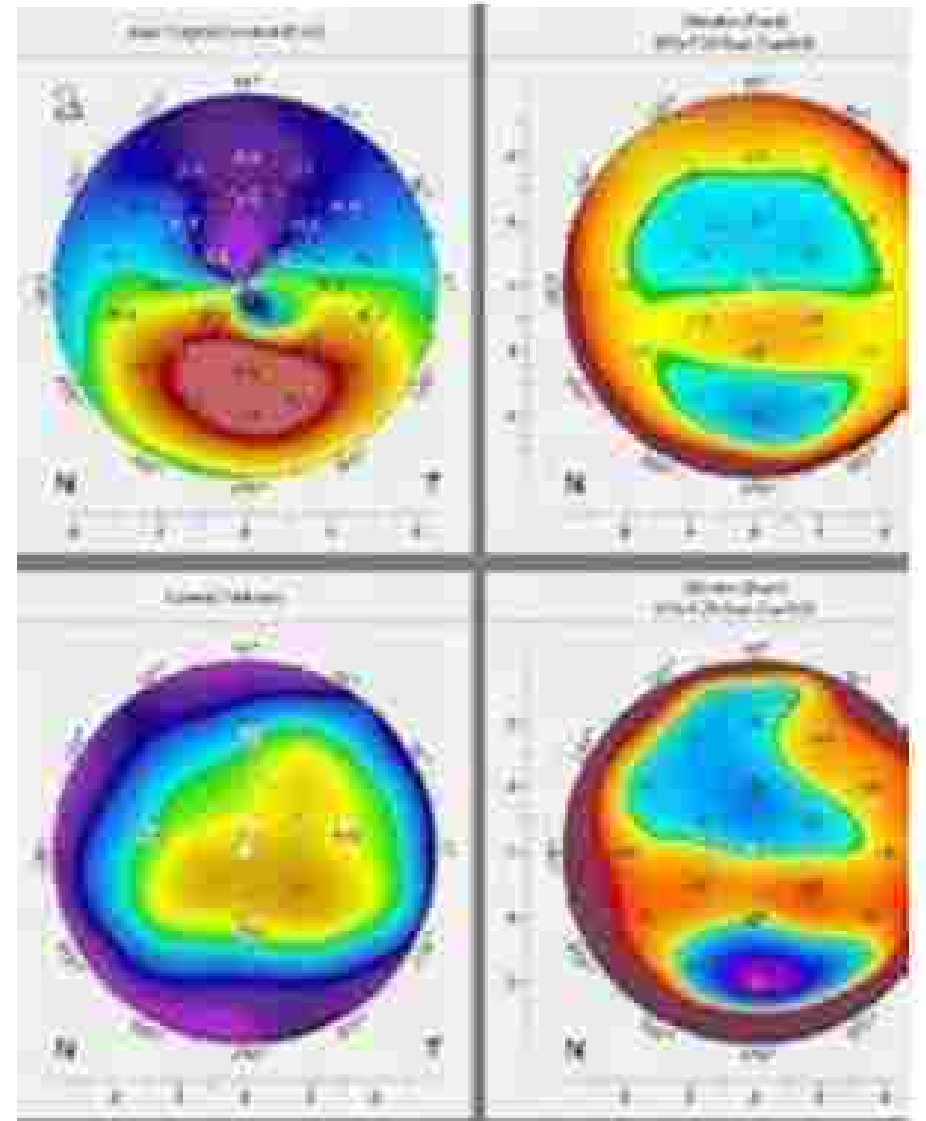
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# DX

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AP	48.73	48.73	48.73	48.73	48.73	48.73	48.73	48.73	48.73
MP	48.73	48.73	48.73	48.73	48.73	48.73	48.73	48.73	48.73
IP	48.73	48.73	48.73	48.73	48.73	48.73	48.73	48.73	48.73
SP	48.73	48.73	48.73	48.73	48.73	48.73	48.73	48.73	48.73
BP	48.73	48.73	48.73	48.73	48.73	48.73	48.73	48.73	48.73
CP	48.73	48.73	48.73	48.73	48.73	48.73	48.73	48.73	48.73
GP	48.73	48.73	48.73	48.73	48.73	48.73	48.73	48.73	48.73
HP	48.73	48.73	48.73	48.73	48.73	48.73	48.73	48.73	48.73
EP	48.73	48.73	48.73	48.73	48.73	48.73	48.73	48.73	48.73
OP	48.73	48.73	48.73	48.73	48.73	48.73	48.73	48.73	48.73



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