

# **Refractive Errors Frequently Asked Questions (FAQs)**

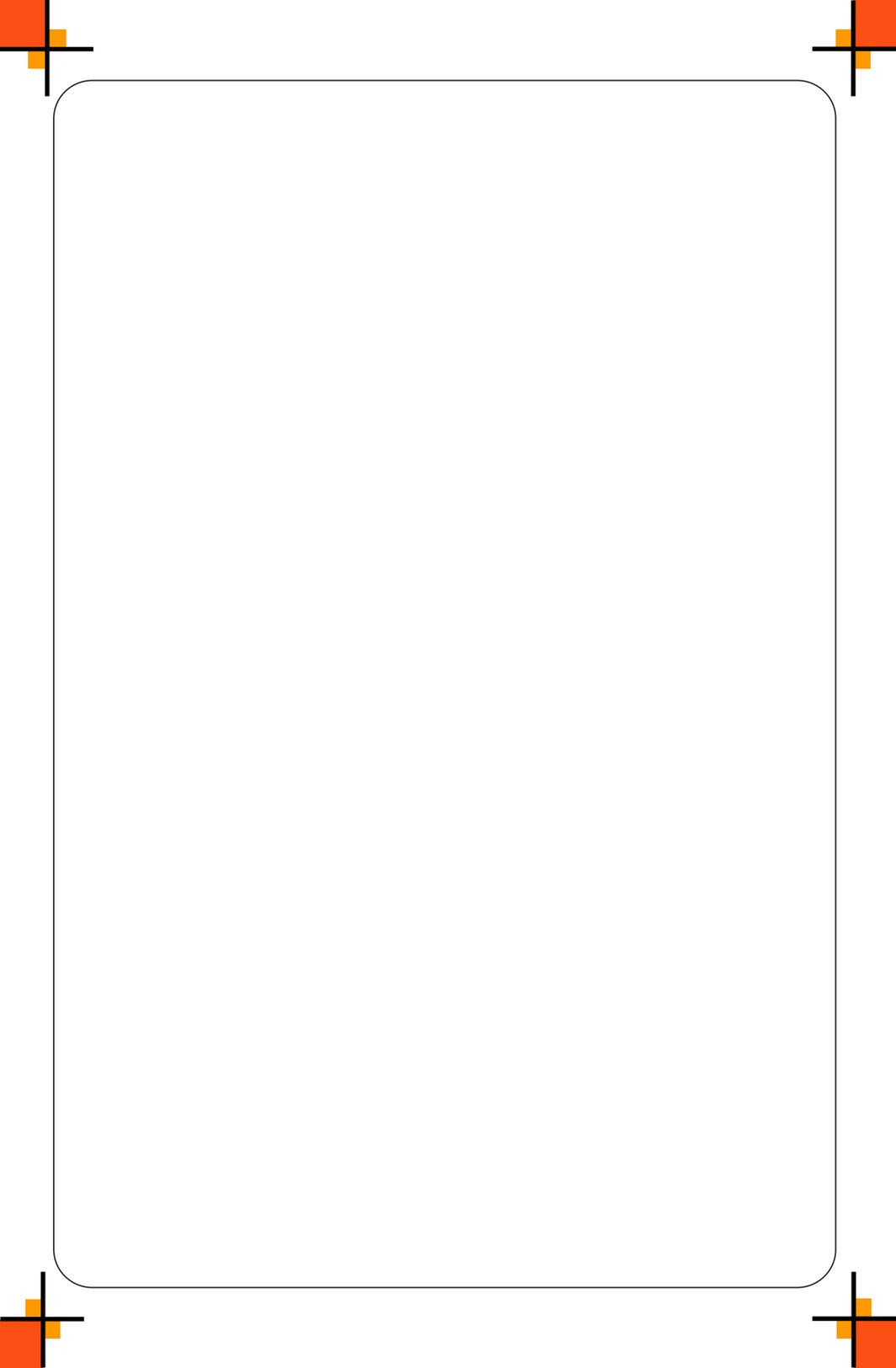
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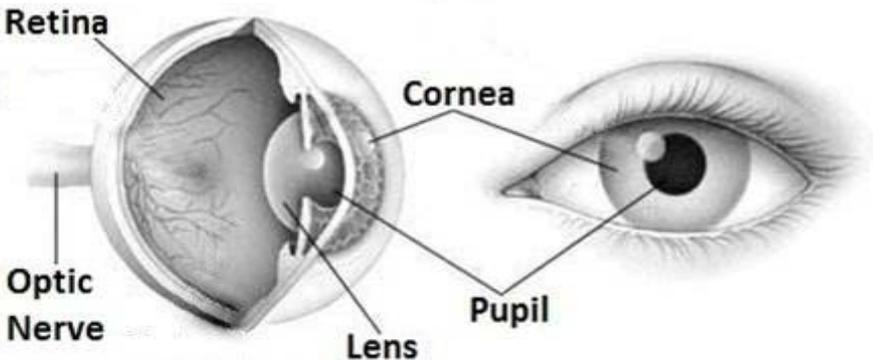


## Outline of FAQs

- **Introduction to Refractive Errors**
- **Types of Refractive Errors**
  - **Nearsightedness**
  - **Farsightedness**
  - **Astigmatism**
  - **Presbyopia**
- **Correction of Refractive Errors**
  - **Spectacles (glasses)**
  - **Contact lens**
  - **Lasers and Surgery**

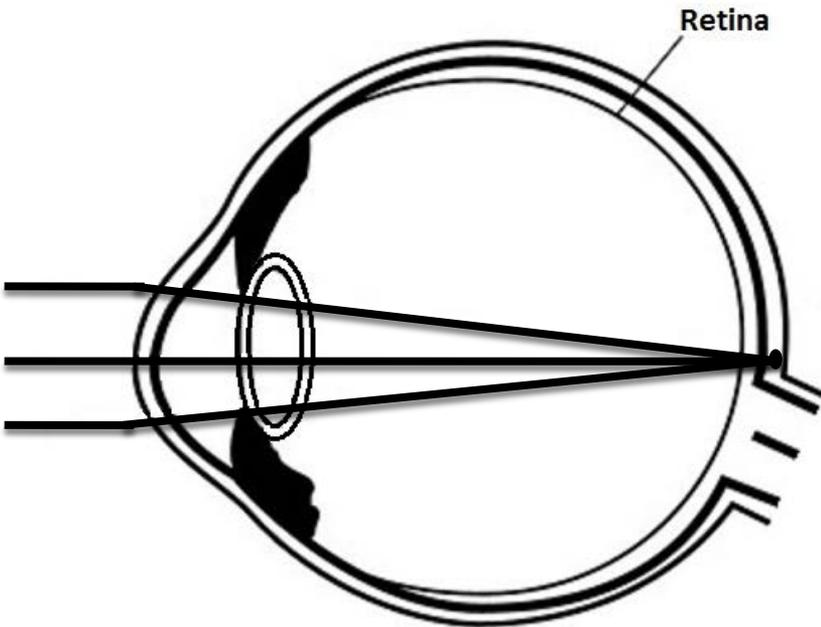
# How do we see objects?

- The light enters the eyes in the form of rays.
- It passes through the following parts of the eye:
  - Cornea - Front, transparent part covering the coloured portion of the eyeball.
  - Lens - Transparent structure located behind the central black hole (pupil) within the eye.
  - Retina - Back of the eye.
- The light rays focus and converge on the retina after passing through the cornea and lens.
- The retina is connected to the brain through the optic nerve that transmits signals.
- The images are sensed through signals transmitted from the retina to the brain.



## How are objects focused?

- The light rays from an object need to converge at the retina to form a clear image.
- The cornea and lens are critical for focusing the light rays to the retina.
- Correct length of the eyeball, shape (thickness) and curvature, especially of the cornea and lens determine the right focus of the objects on the retina.



**Normal Eye**

## What are refractive errors?

- Refractive errors occur when light rays do not focus properly on retina.
- A person with refractive error has an abnormality in one or more of the following:
  - Length of the eyeball.
  - Thickness of cornea and/or lens.
  - Curvature of cornea and/or lens (measured in diopters).

## How common are refractive errors in India?

- It is the commonest eye problem in India.
- The proportion of people found to have refractive errors in a community at any given time is around 25%.
- About 20% of blindness is contributed by uncorrected refractive errors.
- Around 5-15% of children in the school age group are found to have refractive errors.

## What do persons with refractive errors, commonly complain of ?

- Diminished vision is the commonest symptom.
- Tiredness and watering of eyes.
- Headache/Eyeache.
- Frequent blinking/squeezing eyelids or rubbing of eyes.

## Do the eyes of a person with refractive error look normal?

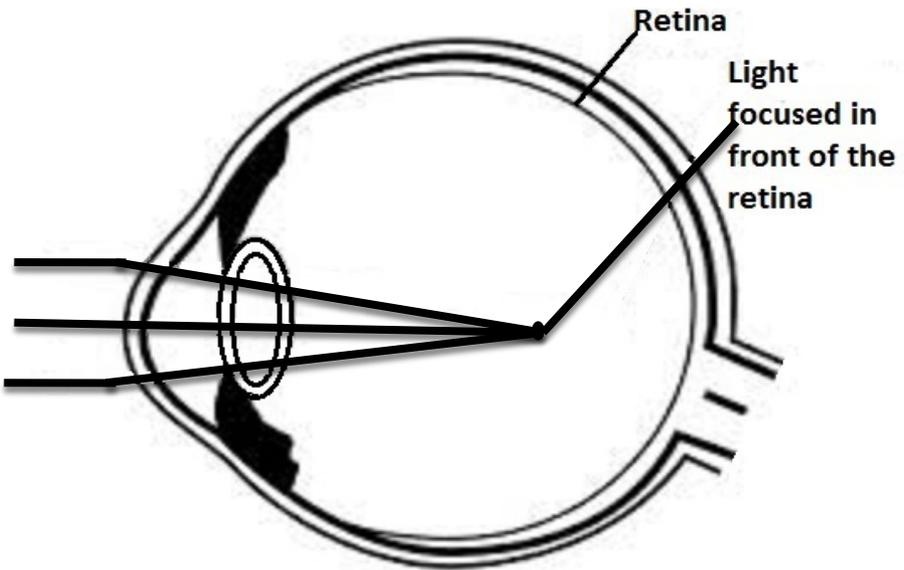
- Yes, the eyes appear normal.
- However, some children with refractive error may complain of frequent lid swelling or may have squint (cross-eyes).

## What are different types of refractive errors?

- There are four broad types of refractive errors:
  - Nearsightedness
  - Astigmatism
  - Farsightedness
  - Presbyopia

# What is nearsightedness?

- This is also called as myopia in medical terms.
- The person is able to view near objects clearly, but distant objects are not clear.
- Light rays in this condition focus in front of the retina and not on the retina.



**Myopia**

## What leads to nearsightedness?

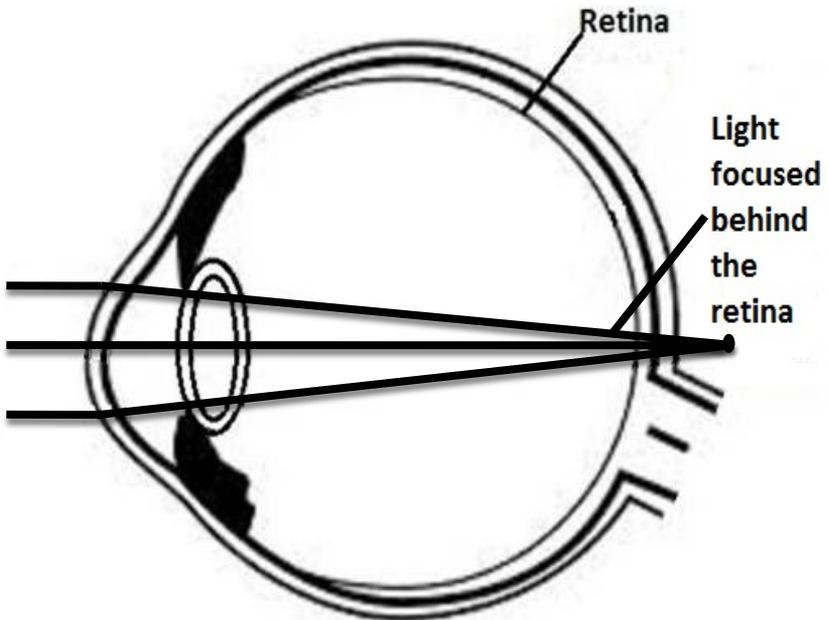
- When the eyeball is longer than usual, a person has nearsightedness.
- When the cornea or lens of the eye has an increased curvature or are abnormal in shape, a person may present with nearsightedness.

## At what age does nearsightedness usually occur?

- It occurs in both children and adults.
- It usually occurs in children between 6 and 15 years of age.
- It may progress till 20 years of age, with growth of the eyeball.
- Usually, little change occurs after 20 years of age.

# What is farsightedness?

- It is also called as hypermetropia or hyperopia in medical terms.
- The person is able to view far objects clearly, but objects seen from near, are not clear.



**Hypermetropia or Hyperopia**

## What leads to farsightedness?

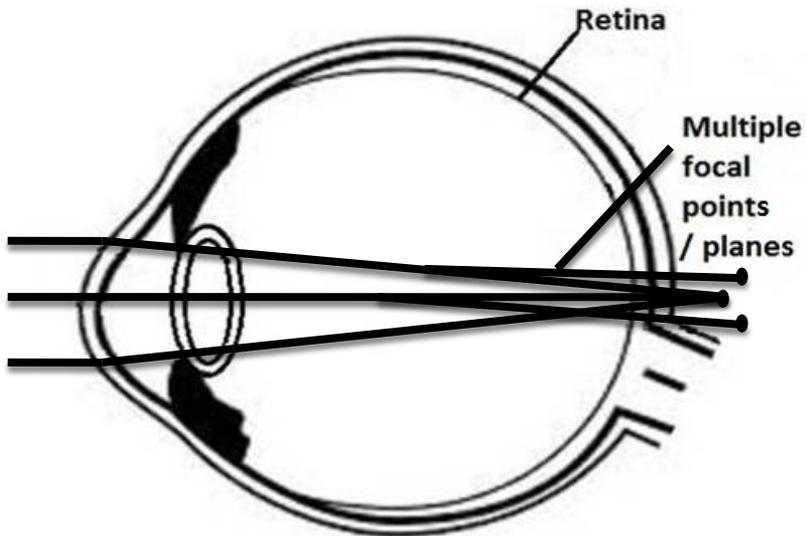
- When the eyeball is shorter than its normal length, a person has farsightedness.
- When the cornea (front layer of the eyeball) and/or lens are flatter than their normal curvature, a person has farsightedness.

## Is there any relationship between farsightedness and age?

- At birth, babies usually have farsightedness due to small eyeballs.
- The degree of hyperopia usually decreases and corrects by itself till the child attains the age of five years.
- However, it may remain in some people till a later age.

# What is astigmatism?

- In this, the focused rays of light do not fall uniformly on the retina.
- The light rays in one plane or meridian either fall behind or in front of the retina.
- The images are often blurred and distorted.
- Their complaints are similar to patients with other types of refractive errors.



**Astigmatism**

## What is presbyopia?

- This is usually found after the age of 35 years.
- In this, the person is not able to see near objects.
- With increase in age, the lens of the eye cannot alter its shape needed for focusing on close objects.
- This is a normal ageing process in the lens of the eyes and occurs universally to everybody.

## What are common complaints reported by a presbyopic person?

- Difficulty in Near Vision tasks like:
  - Reading newspaper print and books.
  - Threading the needle.
  - Reading small print on medicines, mobile phones etc.
  - Sorting rice and pulses.

## How common is presbyopia?

- Most people above the age of 40 years have presbyopia.

## Is presbyopic correction needed by only literate people?

- No, it is not so.
- People who do not read and write, will also require presbyopic correction because other near activities like sorting gains, threading the needle etc. are also affected by presbyopia.

## Can people suffering with other types of refractive errors, also have presbyopia?

- Yes, people with nearsightedness or farsightedness also have presbyopia as their age advances.

## When should eyesight be checked?

- When the child starts going to school at entry level.
- After that, once a year.
- For children wearing glasses, once every six months.
- Adults when they turn 35 to 40 years, especially for near vision.

# When should parents get their child's eyesight checked for refractive errors?

- If any of the following is observed in children by parents:
  - One eye drifts or aims in a different direction than the other.
  - The child blinks or rubs his/her eyes excessively on watching TV or reading.
  - The child frequently bumps into things or drops things.
  - The child holds reading material or objects too close, turns or tilts head to focus.
- The child frequently complains of headaches, eyestrain, double vision or blurring of vision.
- The child has watering of eyes.
- The child is not able to read the blackboard from the back benches of the classroom.
- The child less than one year of age does not follow light or objects.

## What is squint?

- In this, both the eyes look in different directions (crossed eyes).



## What is amblyopia (lazy eye)?

- In this condition, the brain blocks image formation from one eye because it cannot use the two eyes together as they are not getting equal impulses.
- It usually occurs before the age of eight years due to faulty vision development.
- It can occur in the presence of crossed eyes, unequal refractive error or physical obstruction of vision.
- Children should be detected with this condition early so that treatment can be initiated and poor vision can be treated.
- Children with astigmatism, if not corrected early will develop amblyopia.

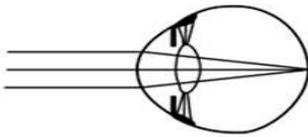
# How are refractive errors corrected?

- Spectacles (glasses)
- Contact lenses
- Lasers and Surgery

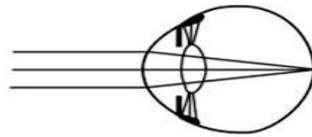


# What kind of spectacles/glasses are prescribed for refractive errors?

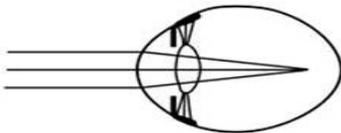
- For correcting nearsightedness, minus (or concave) spherical lenses are used.
- For correcting farsightedness, plus (or convex) spherical lenses are used.
- For correcting astigmatism, cylindrical lenses are used.
- For presbyopia, plus lenses are used.



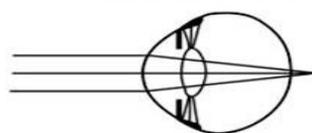
**Normal Eye**  
**Myopia**



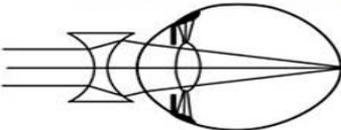
**Normal Eye**  
**Hypermetropia**



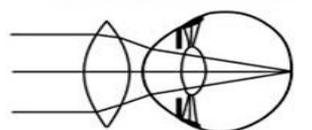
**Light focused**  
**infront of the retina**



**Light focused**  
**behind the retina**



**Corrected with Concave Lens**



**Corrected with Convex Lens**

# What are the different types of spectacles?

There are four types of spectacles:

- Single vision spectacles
- Bifocal spectacles
- Progressive lens spectacles
- Ready-made spectacles

# What are single vision spectacles?

- They are used by persons who have either nearsightedness or farsightedness.
- Two such spectacles can be used by a person who has both presbyopia and farsightedness.

## What are bifocal spectacles?

- Bifocal means there are two types of power in the same lens.
- These spectacles have an upper part that is for distance vision and lower part for near vision correction.

## What are progressive lens spectacles?

- It corrects for distance, intermediate and near vision.
- There are no lines, unlike bifocal lenses that have a line in between separating two segments of the spectacle.
- The power of the lens progressively increases from top to bottom as per the patient's prescription.

## What are readymade spectacles?

- These are spectacles with a known fixed power.
- They are usually prescribed if both the eyes have a similar refractive error.
- They are less expensive than custom made spectacles.
- Presbyopic spectacles are commonly available as ready made spectacles.

## How are spectacles prescribed when a person has both presbyopia and any other refractive error for distance?

- All types of correction can be offered – that is in addition to refractive error, presbyopia can also be corrected.
- Separate near vision glasses can be made or other type of glasses like bifocal or progressive addition lenses can be used.

## Can one get prescription for spectacles through a computerized machine?

- Yes; this machine is called auto- refractometer.
- The spectacle prescription from this machine should be confirmed with manual testing by a trained eye technician.

## How should one choose the right kind of spectacle frame?

- Choose a frame that fits and aligns well with your head and face properly.
- Some frames are not suitable for individuals who need lenses of high power.
- Remember spectacle frame features can be adjusted.
- For children, plastic and larger frames are preferred.

## Can one have problems after wearing spectacles for the first time?

- Use the spectacles for about two weeks to get adjusted to them.
- If a person has any problem after two weeks, an eye doctor must be consulted.
- Some people have slight headache for a few days when they start wearing spectacles. This is more often seen with cylindrical correction for astigmatism.

## How should one take care of spectacles?

- Clean spectacles with cold water and soap/washing detergent. Dry it using soft and clean cloth.
- To avoid scratches on the lenses, do not put the spectacles with lenses face down in contact with the surface.
- When not using spectacles, keep them in a case, preferably in a hard case.

## What are the common reasons for not using spectacles?

- People may not know that they need spectacles.
- Spectacles may not be acceptable for social reasons.
- Eye care services may not be available in their vicinity.
- They may not be able to afford spectacles especially for replacing broken ones.

## Are school children compliant to wearing spectacles?

- School children may often discontinue wearing spectacles for following reasons:
  - Improper fitting and power of prescribed lens,
  - Teasing by fellow children,
  - Parents' disapproval,
  - Losing and breaking a pair of glasses, especially at time of play
- Remember, refractive errors if not corrected will lead to problems in vision, and glasses are the only ways to correct them. So these should be worn regularly for the entire waking period.

## What are Contact Lenses?

- They are thin discs made of plastic that can cover the front of the eyes (cornea).
- They can be used alternatively to spectacles for correction of refractive errors.



## Can all persons wear contact lenses in the eyes?

- It is necessary to consult an eye specialist before deciding to wear contact lenses.
- The eye specialist shall decide suitability for wearing contact lenses.
- Using contact lenses demands proper handling and care.

# What are different types of contact lenses?

- **Soft lenses: Made from hydrogel plastic material containing water:**
  - **Disposable (daily, two-weekly or monthly replacement) or non disposable**
  - **Coloured or clear**
  - **Spherical (correct myopia/hypermétropia) or toric (correct astigmatism)**
  - **Extended wear (made from silicone material which transmits oxygen well)**
  - **Multifocal (for visualizing objects at various distances)**
- **Rigid gas permeable (RGP) lenses/Semi-soft lenses (effective in correcting astigmatism)**
- **Hard lenses (rarely prescribed due to poor comfort)**

## How does one take care of contact lenses?

- Wash your hands properly with soap and lots of water before touching and using contact lenses.
- Insert and remove from eyes with utmost care.
- Keep your nails trimmed and clean.
- Use appropriate contact lens solutions for cleaning lenses before and after insertion into eye.
- Dispose off the lens after their specified time, even if they appear good to your eyes.
- Wear sunglasses/protective glasses over lenses in crowded/windy/ dusty places.
- Don't ever sleep with the lenses in your eyes.
- Follow all instructions given by the eye specialist.
- Don't use tap water in any circumstance to come in contact of contact lens - this can lead to infection in the eye.
- Clean your lens case regularly.

## For how long in a day, can contact lenses be worn?

- Contact lenses should be worn for prescribed number of hours only.
- Avoid over-wear of contact lenses to prevent complications.
- The use of contact lenses depends on the type of lens. The usual recommended wearing timing of contact lens is 6-8 hours.

## What are the problems that can occur with the use of contact lenses?

- There can be dryness, tiredness and irritation of the eye.
- There can be itching in the eye, if you develop allergy.
- Lack of proper hygiene and improper care of contact lenses can result in eye infection.
- There is a risk of damaging the outer layer of the eye (cornea) with prolonged use of contact lens.
- Consult your eye specialist for all of the above.

## Is there any other treatment for refractive errors?

- Yes, this is called as refractive surgery.
- The most popular surgical procedure is **LASIK**.
- **LASIK** stands for **L**aser in **S**itu **K**eratomileusis; in simple terms it refers to laser assisted surgery for refractive errors.

## What is done in **LASIK** surgery?

- In **LASIK**, laser energy (cool beam of light) is used to correct the shape (curvature) of the cornea - front surface of the eye, that helps in focusing the images correctly on the retina.
- In this way, it corrects all types of refractive errors- nearsightedness, farsightedness and astigmatism.

## What is needed before **LASIK** surgery?

- The eye specialist will consider the fitness for this procedure.
  - Person should be at least 18 years of age.
  - Thorough examination and evaluation of the eye before the procedure is essential.
  - Contact lens users will have to stop wearing lenses for few weeks prior to surgery.
  - Eye make up and cosmetics should be avoided before LASIK surgery.

## How much time it will take for getting **LASIK** done?

- **LASIK** is an outpatient procedure.
- The actual laser procedure will take place in less than 5 minutes. The overall procedure may take half an hour for both the eyes.

## Is there any pain during **LASIK** procedure and afterwards?

- The eye doctor will put drops in the eye to make it numb (anaesthetic eye drops), so there will not be any pain while the surgery is done.
- After the surgery, one may have slight pain or discomfort which will last less than a day or two.
- Go to the clinic/ hospital for having **LASIK** procedure with some known person to assist you after the surgery.

## Can one get operated in both the eyes together for **LASIK**?

- Yes, usually **LASIK** is done in both eyes in the same sitting.
- Procedures other than **LASIK** for refractive errors may need you to have separate sittings for each eye.

## What is the immediate care after **LASIK** surgery?

- The eye Doctor will give instructions regarding follow up visits.
- The eyes should not be rubbed even in case of foreign body sensation or irritation in the eyes.
- Eye should not be washed with water.
- Eye make up is to be avoided.

## What if a patient is rejected for **LASIK** surgery?

- A sizeable number of patients screened are not found suitable for the LASIK surgery due to high value of refractive errors or thin corneas.
- There are alternative refractive eye surgeries that can be considered for these patients by eye specialists.
  - Implantable Contact Lens or Phakic Intra ocular lens: Placed inside the eye in front of the patients' natural lens.
  - Clear Lens extraction: Replacing the non-cataractous crystalline lens with artificial intraocular lens (IOL) for refractive purpose.

## Are there any risks involved with **LASIK** procedure?

- Any surgical procedure of the eye can have certain side effects.
- Usually patients may have pain or discomfort for a few days after the surgery.
- Some may complain of dryness in the eyes, halos around eyes or increased sensitivity to bright light (glare) after the surgery.
- **LASIK** does not prevent presbyopia, so around the age of 40, near correction will be needed.

## Is refractive correction required after **LASIK** procedure?

- Usually, the patient does not require correction after **LASIK**.
- In some cases after **LASIK**, refractive correction may be required by spectacles or contact lenses for residual refractive error.

## What are considered good habits for general eye care?

- Spend more time outdoors in natural light.
- Reduce time watching screens- TV, computer, mobile, video games and tablets/ notepads.
- Maintain distance between eye & book/screen at least 30cm.
- Keep rooms well lit and illuminated.
- Read books, tablets, computers in sitting posture.

## Can prolonged use of computers affect your eyes?

- Yes, prolonged use of computers can lead to eye problems.
- The common complaints cited are eyestrain, headaches, blurring of vision, irritated, dry eyes and tiredness of eyes.
- Persons with refractive errors who do not have powers corrected adequately may complain of these symptoms more frequently.
- Persons in jobs demanding prolonged use of computers should get their eyes checked frequently.

# What are considered good habits to prevent bad effect of computers on eyes?

- Use proper light, avoid excess bright light both from outdoors and indoors while using computers.
- If you wear glasses, use ones with anti-reflective coating.
- Use proper brightness and contrast of your computer screen.
- Practice rule of 20 - 20 - 20. After every 20 minutes, view a distant object at least 20 feet away for at least 20 seconds.
- Take frequent breaks from viewing the computer continuously.