

Contact Lens

Contact lenses are the smallest, least visible, the finest of all devices for correcting refractive errors of the eye. Prescribing and fitting contact lenses have become an integral part of today's comprehensive ophthalmology practice. Many people are using contact lenses for cosmetic purposes. Other reasons for wearing contact lenses include occupational preferences, sports and therapeutic uses.

History

The idea of contact lens was first conceived by Leonardo da Vinci in 1508. He described a glass cup containing water which was placed over the eye, eliminating the cornea as a refractive surface.

Advantages of contact lenses

There are several advantages of contact lenses over spectacles. Some of them are:

1. Fewer magnification effects
2. Decreased peripheral and chromatic aberrations
3. Increase in the size of visual fields
4. Marked decrease in aniseikonia in monocular aphakia and Anisometropia.
5. Good Cosmetic appearance.
6. Permits better correction for refractive errors that occur with keratoconus and irregular astigmatism.

Indications

- a. Optical: Myopia, Hypermetropia, Astigmatism, Presbyopia, Aphakia, Post Keratoplasty, Keratoconus .
- b. Orthoptic uses: Anisometropia, Amblyopia (Occlusion).
- c. Special Uses: Albinism, Aniridia, Nystagmus with Refractive error, coloboma, symblepharon.
- d. Therapeutic uses: Bullous Keratopathy, corneal ulcers, Glaucoma therapy (for Drug Delivery)
- e. Prosthetic uses: Pthisical eye, corneal opacity, leukoma , corneal scars.
- f. Surgical Uses: Corneal protection at surgery

Contra Indications

- i. There are several contra indications especially Dry eyes, lid problems such as active Blepharitis, stye, chalazion, entropion
- ii. Acute and chronic conjunctivitis, corneal abrasions, hyphema, Vth nerve paralysis, hypopyon, Uveitis and iritis

- iii. Some Rare contra indications are allergies, Uncontrolled diabetes, pregnancy period and Pterygium

Types

Modern system classifies contact lens into three major types such as

- i. Soft
- ii. Semi soft and
- iii. Hard contact lens

Soft Contact Lens

Well flexible contact lenses that are composed of either hydrogel or silicon material. These soft contact lenses are made up of different polymers but basically Hydroxy ethyl metha acrylate (HEMA) which is a stable, clear, nontoxic, non allergic, and optically desired material. These lenses are usually larger in size than the cornea for optimum centring and stability. It is much more comfortable than rigid lens, because of its soft qualities and its ability to flex on blinking. Its larger size produces a fit with its edge lying under the upper and lower eye lids.

Advantages

- a. More comfortable because the lens fits under the eyelid margins, flexes with each blink and the softness permits more oxygen to reach the cornea
- b. Spectacle blur is uncommon.
- c. Less chances of lens loss, because of larger size and minimal movement.
- d. Minimal over wear reaction, because of its soft nature and to create oxygen tear pump mechanism by flexing with each blink.
- e. Less glare and photophobia.
- f. Ideal for children because of comfort and less chances of lens loss factor.

Semisoft contact lens

Gas permeable lenses which made up of a unique plastic that has the ability to permit oxygen to diffuse into and Carbon dioxide to diffuse out of the lens.

Materials

- 1. CAB (Cellulose Acetyl Butyrate) lenses
- 2. Silicon Acrylate
- 3. Butylstyrene

Advantages

- 1. Increased comfort

2. Longer wearing time
3. Reduced corneal edema, spectacle blur and over wear syndrome.
4. Rapid adaptation
5. Permeability of more oxygen than other lenses
6. Larger optic zone consequently offers increased visual field and less glare.
7. Gas permeable lenses in a spheric form can cover upto five diopters of astigmatism.

Hard Contact Lens

1. Hard contact lens is made up of PMMA (Poly methyl metha acrylate) which is a stable, clear, non toxic, non allergic, easily worked and optically desied material. It can be moulded or lathed and the stability of PMMA is more than RGP lenses. The oxygen permeability of hard contact lens is almost nil. It provides oxygen only by means of tear pump.

Other Lenses

Piggy-back contact lenses

It is basically the wearing of a soft lens against the cornea to provide comfort and a rigid lens over the soft to attain vision.

X - chrome Lens

Is a type of contact lens which improves the colour discriminations for the colour blindness people who is partially blind in red-green area.

Bandage Contact lens

Is used to protect the cornea from external influences and permit healing of underlying corneal disorders.

Prosthetic Contact Lens

Tinted lenses for corneal prosthesis. Prescribed for corneal opacity, leucoma, corneal scars, pthysical eye.

Toric contact lens

Lenses used for astigmatism. It has different radii of curvature in each meridians. ie

The principle meridians differ by 90 degrees. Front toric, Back toric and Bi toric

lenses are available.

Ortho - Keratology

The technique of flattening the cornea and thus correcting refractive errors by the use

of a series of progressively flatter contact lenses.

Contact lens care and maintenance

Contact lens care and maintenance is one of the most crucial aspects of contact lens wear. It can influence the success of contact lens wear and patient's satisfaction.

Lens care and maintainence procedure really have 4 steps (cleaning, rinsing, disinfecting and storing the lenses)

Cleaning

The daily cleaners usually contains surfactants and are used to remove most loosely bound foreign bodies on the lens which includes cell debris, mucus, lipid, protein and micro organisms. The mechanical action of rubbing reduces the amount of loose debris and also enhances the efficacy of the solutions surfactant properties.

Rinsing

After cleaning, the lenses could be rinsed. The rinsing procedure helps to remove the loosened deposits, and some microorganisms.

Disinfecting & Storage

The process of disinfecting helps to kill or deactivate the microorganisms. Ideally there are two types of disinfecting systems

Thermal disinfection

The lenses should be placed in the case with saline solution and heated to 70°C - 80°C for 10 - 20 minutes.

Chemical Disinfecting

Hydrogen peroxide based solutions are used for chemical disinfection. This is reasonably effective within 10 - 15 minutes.

These disinfecting solutions also used for storage. They are functioning as a hydrating medium which helps to maintain the stability of contact lens parameters and physical parameters.

Multi purpose solutions

The modern lens care systems use one solution to perform the functions of a number of components. For ease of use and patients convenience, multipurpose solutions are formulated to allow cleaning, rinsing, soaking and disinfecting functions to be combined.

To avoid lens contaminations, the lens case should be rinsed after every use and the lenses should be stored in fresh solution. For better lens care, change the lens case monthly.

Complications

The complications of contact lens in various aspects include:

- Hypoxic related problems such as corneal edema, Superficial punctate keratitis, decreased sensation, superficial and deep infiltrates, vascularisation, superior limbal kerato conjunctivitis, epithelial microcysts.
- Allergic related problems include hyperemia, sterile infiltrates, Giant papillary conjunctivitis.

Conclusion

Thus contact lenses are the ideal choice for refractive errors which give better vision correction without any distortions. At the same time proper lens care and regular followup are very essential to maintain a good ocular health.