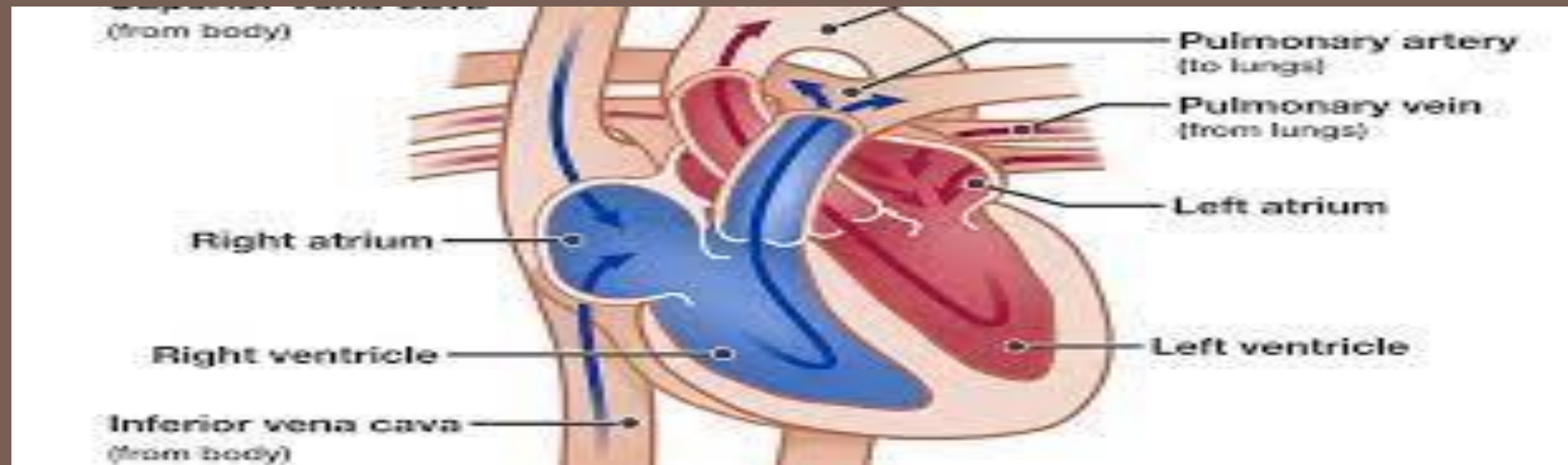


CIRCULATORY SYSTEM



Key terms

Circulatory system:-

The body system responsible for carrying blood, nutrients, and waste throughout the body

. Cardiac :-

Related to the heart

circulatory system

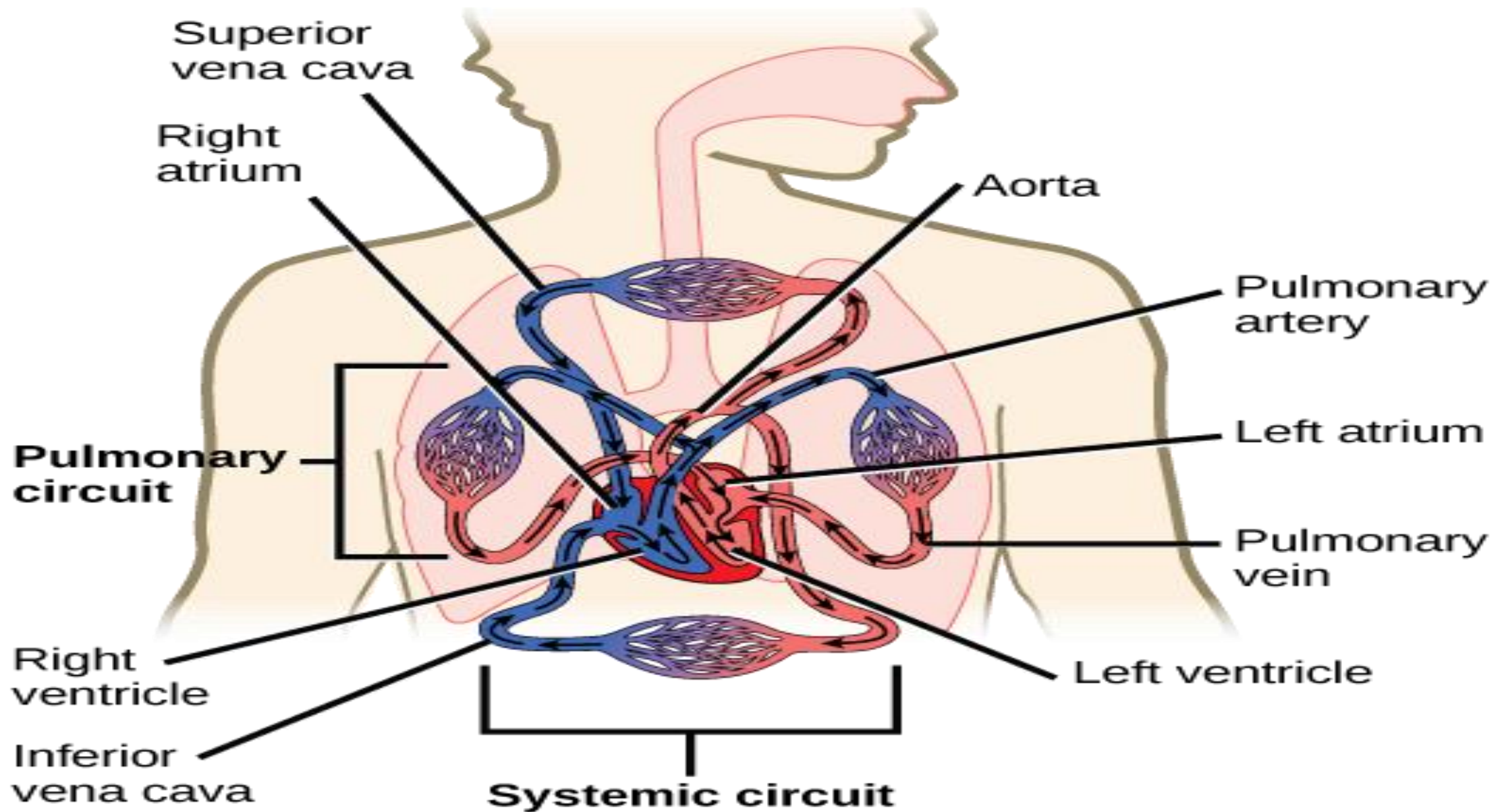
The circulatory system is a network consisting of blood, blood vessels, and the heart. This network supplies tissues in the body with oxygen and other nutrients, transports hormones, and removes unnecessary waste products

heart

The heart is made of specialized cardiac muscle tissue that allows it to □
act as a pump within the circulatory system The human heart is
divided into four chambers. There are one atrium and one ventricle on
each side of the heart. The atria receive blood and the ventricles pump
blood.

human circulatory system consists of circuits

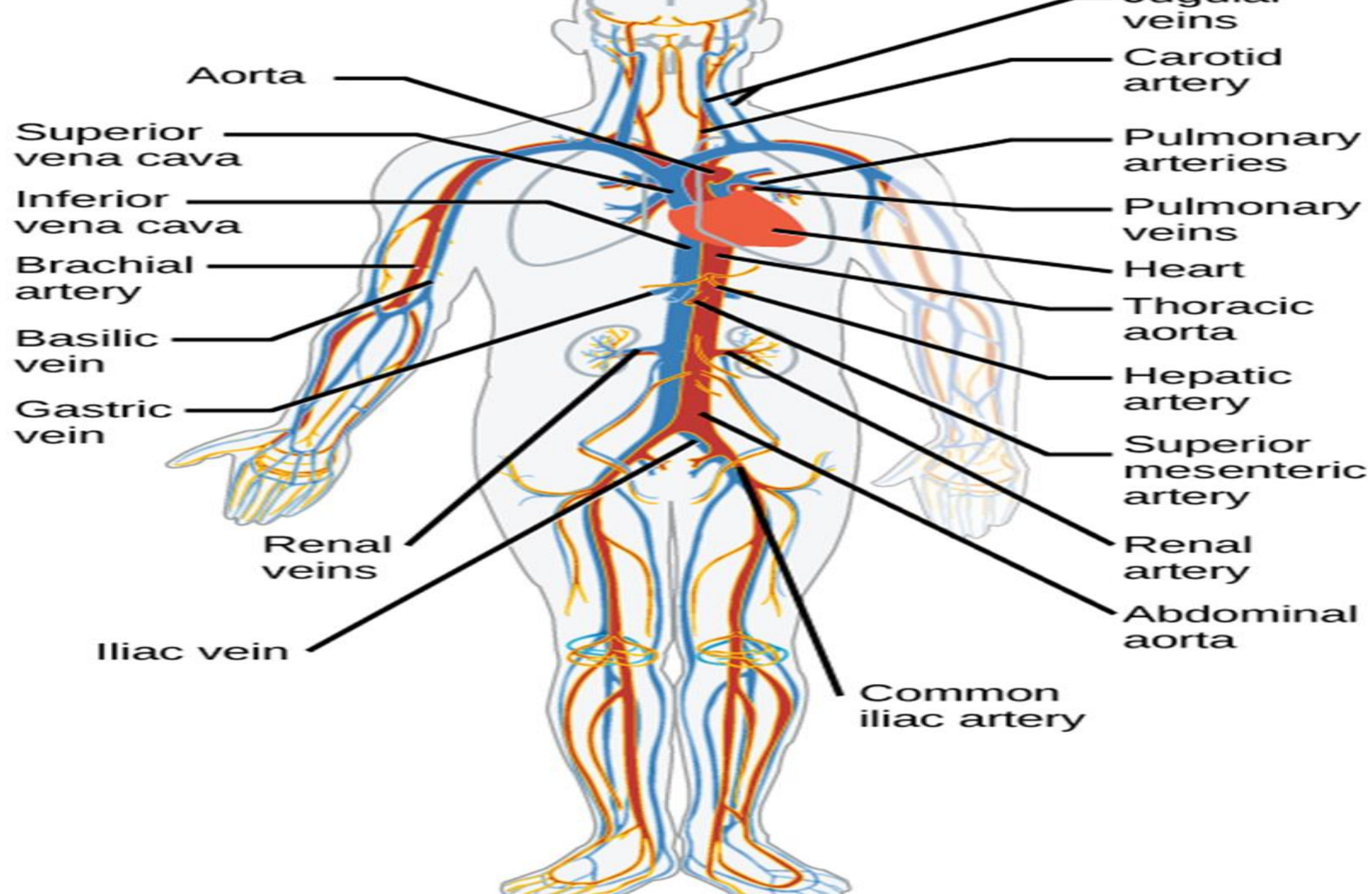
- - ---The pulmonary circuit provides blood flow between the heart and lungs. □
- ---The systemic circuit allows blood to flow to and from the rest of the body. □
- ---The coronary circuit strictly provides blood to the heart □



Blood and blood vessels

Blood from the heart is pumped throughout the body using blood vessels. Arteries carry blood away from the heart and into capillaries, providing oxygen (and other nutrients) to tissue and cells. Once oxygen is removed, the blood travels back to the lungs, where it is reoxygenated and returned by veins to the heart. □

The main artery of the systemic circuit is the aorta which branches out into other arteries, carrying blood to different parts of the body. □





Anisometropia


Anisometropia

When two eyes have unequal refractive power.

Each eye can be myopia , hyperopia or both and the difference in power of 2 diopter or more .




Blurred vision
amblyopia (lazy eye)



Difference in vision between two eyes is significant and will with normal binocular vision .

Practically they will see a smaller image in one eye and a larger image in the other eye



Etiology

- genetic ☐
- Difference in axial length ☐
- strabismus ☐
- unilateral ocular disease ☐
- post operative ☐
- traumatic ☐

Type of anisometropia



Simple anisometropia ☐



Compound anisometropia ☐



Mixed anisometropia ☐

Simple anisometropia

One eye normal and other emmetropic ☐



simple astigmatic anisometropia ☐



simple hypermetropic anisometropia ☐



simple myopic anisometropia ☐

Compound anisometropia

Both eye same refractive error and the ☐
difference between 2 diopter ☐



compound astigmatic anisometropia ☐



compound hypermetropic anisometropia ☐



compound myopic anisometropia ☐



Mixed anisometropia

Also called ((antimetropia)) □

When each eye differ refractive error □

Ex: one eye is hyper and other is myopic □

Treatment

As soon as it diagnosed it should be treated □

If not treated early the brain may select the eye that bring more clear image and depend on the stronger eye . □

The neglected eye gradually become more week □
.we should treat the case and diagnose the type of illness and deal with it.

After that VA corrected and follow up the patent □
regally every 6 month ..



Contact lens

Contact lenses :

___Contact lenses, or simply contacts, are ☐ thin [lenses](#) placed directly on the surface of the [eyes](#).

Contact lenses are ocular prosthetic devices used by ☐ over 150 million people worldwide Contact lenses are classified in many different ways: -

by their primary function, material, wear schedule ☐ (how long a lens can be worn), and replacement schedule (how long before a lens needs to be discarded).

Functions

- **Correction of refractive error** □
- **Correction of presbyopia** □
- **Other types of vision correction** □
- **Cosmetic contact lenses** □
- **Therapeutic scleral lenses** □
- **Therapeutic soft lenses** □
-


Materials

- Rigid lenses ☐
- Soft lenses ☐
- Hybrid ☐
-

Wear schedule

- "daily wear" (DW) contact lens is designed to be worn for one day and removed before sleeping. □
 - "extended wear" (EW) contact lens is designed for continuous overnight wear, typically for up to 6 consecutive nights. □
 - "continuous wear" (CW). such as silicone hydrogels, allow for even longer wear periods of up to 30 consecutive nights can be worn overnight because of their high oxygen permeability. □
- EW and CW contact lenses typically allow for a transfer of 5–6 times more oxygen than conventional softs, allowing the cornea to remain healthy, even with closed eyelids. □

Wear schedule

Wearing lenses designed for daily wear  overnight has an increased risk for corneal infections, corneal ulcers and [corneal neovascularization](#)—this latter condition, once it sets in, cannot be reversed and will eventually spoil vision acuity through diminishing corneal transparency. The most common complication of extended wear is giant papillary conjunctivitis (GPC), sometimes associated with a poorly fitting contact lens.

Replacement schedule

Contact lenses are often categorized by their replacement schedule. □

Single use lenses (called 1-day or daily disposables) are discarded after one use. Because they do not have to stand up to the wear and tear of repeated uses, these lenses can be made thinner and lighter, greatly improving their comfort. Lenses replaced frequently gather fewer deposits of [allergens](#) and [germs](#), making these lenses preferable for patients with ocular [allergies](#) or for those who are prone to infection. Single-use lenses are also useful for people who wear contact lenses infrequently, or when losing a lens is likely or not easily replaced). They are also considered useful for children because cleaning or disinfecting is not needed, leading to improved compliance. □

Replacement schedule

Other disposable contact lenses are □ designed for replacement every two or four weeks., which used to be very common, are now much less so. Rigid gas permeable lenses are very durable and may last for several years without the need for replacement. PMMA hards were very durable and were commonly worn for 5 to 10 years, but had several drawbacks.

Replacement schedule

Lenses with different replacement schedules can be made of the same material. Although the materials are alike, differences in the manufacturing processes determine if the resulting lens will be a "daily disposable" or one recommended for two or four week replacement. However, sometimes manufacturers use absolutely identical lenses and just repackage them with different labels



Prescriptions

Diameter and base curve radius □

The parameters specified in a contact lens prescription may include: □

Material / Brand name .

Base curve radius (BC, BCR) .

Diameter (D, OAD) .

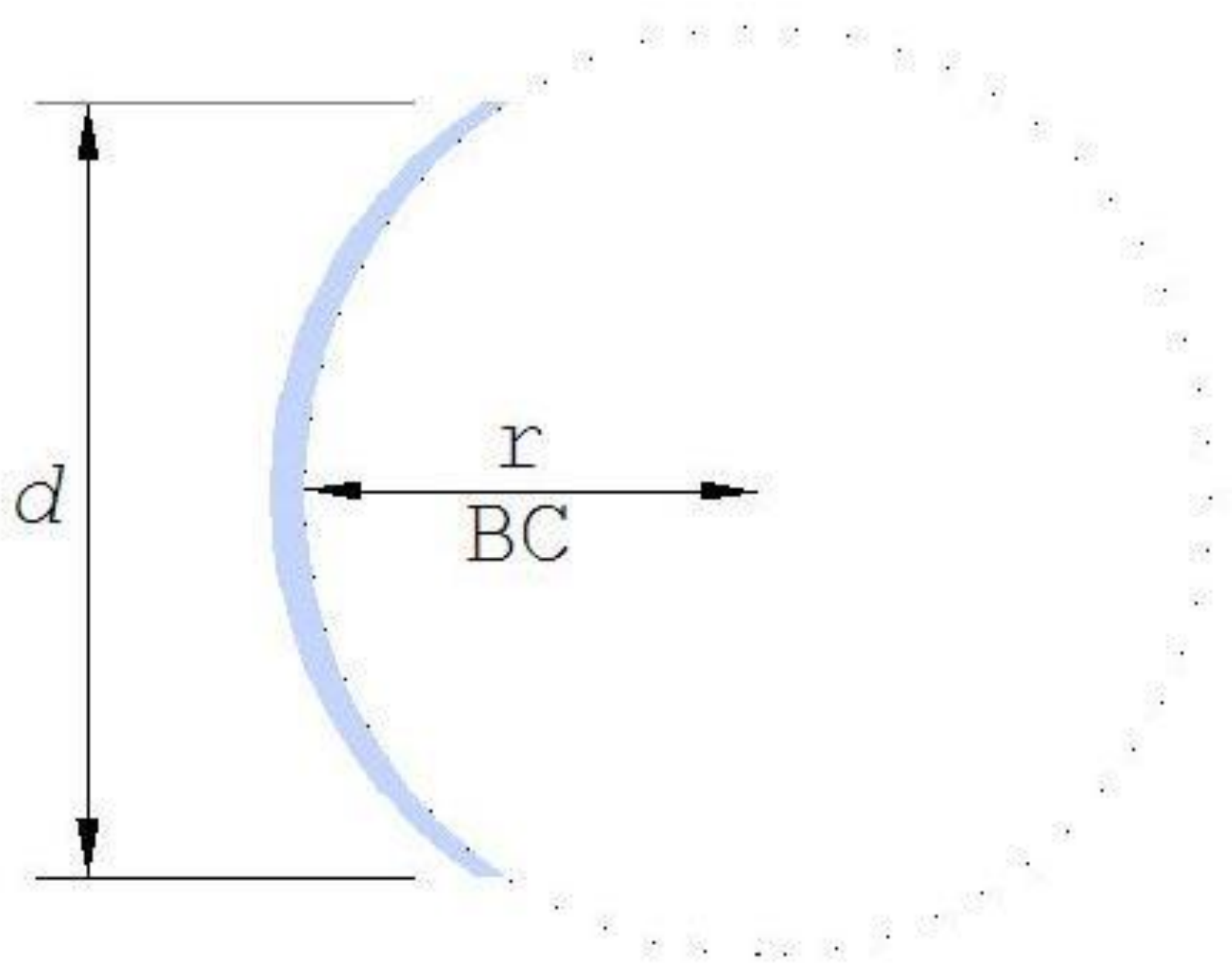
Power in diopters .

Center thickness (CT) .

. □

Prescriptions

Prescriptions for contact lenses and [glasses](#) may be similar, but are not interchangeable. Prescribing of contact lenses is usually restricted to various combinations of [ophthalmologists](#), [optometrists](#) and [opticians](#). An [eye examination](#) is needed to determine an individual's suitability for contact lens wear. This typically includes a [refraction](#) to determine the proper power of the lens and an assessment of the health of the eye's anterior segment. Many eye diseases prohibits contact lens wear, such as active infections, allergies, and dry eye. [Keratometry](#) is especially important in the fitting of rigid lenses



PRESBYOPIA



INTRODUCTION

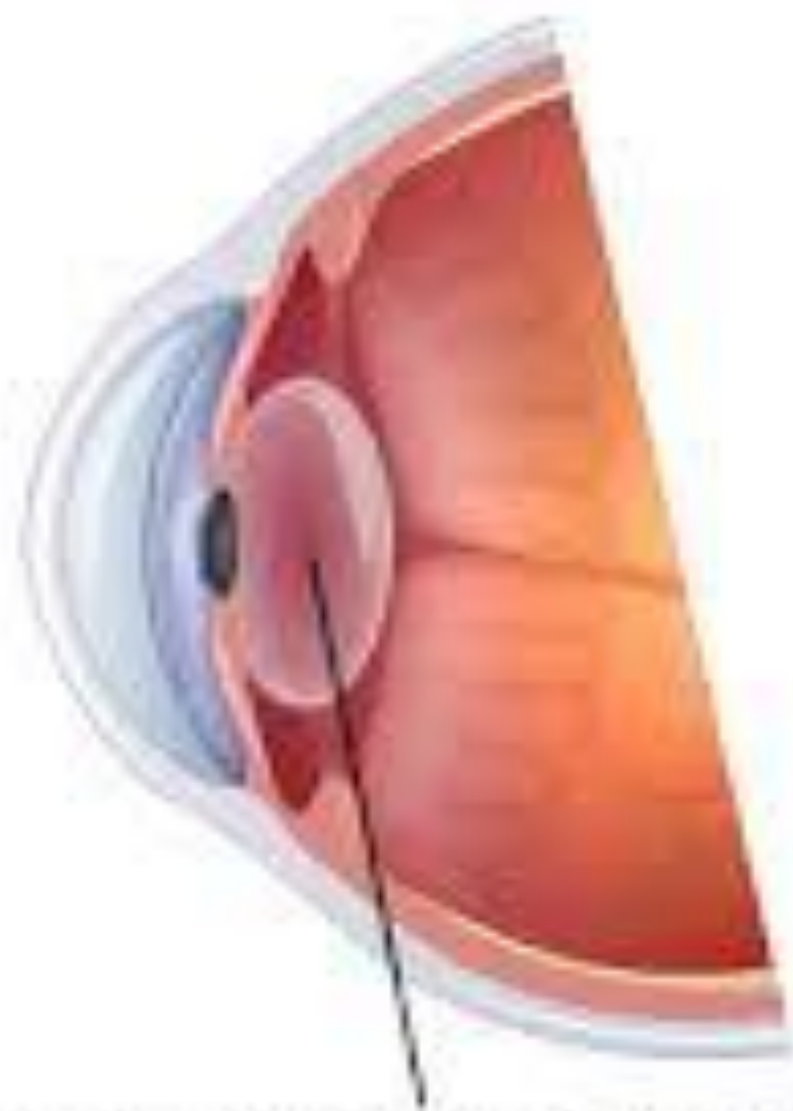
IT COME FROM-----PRESBYS-----OLD MAN
OPIA -----SIGHT

DEFINITION

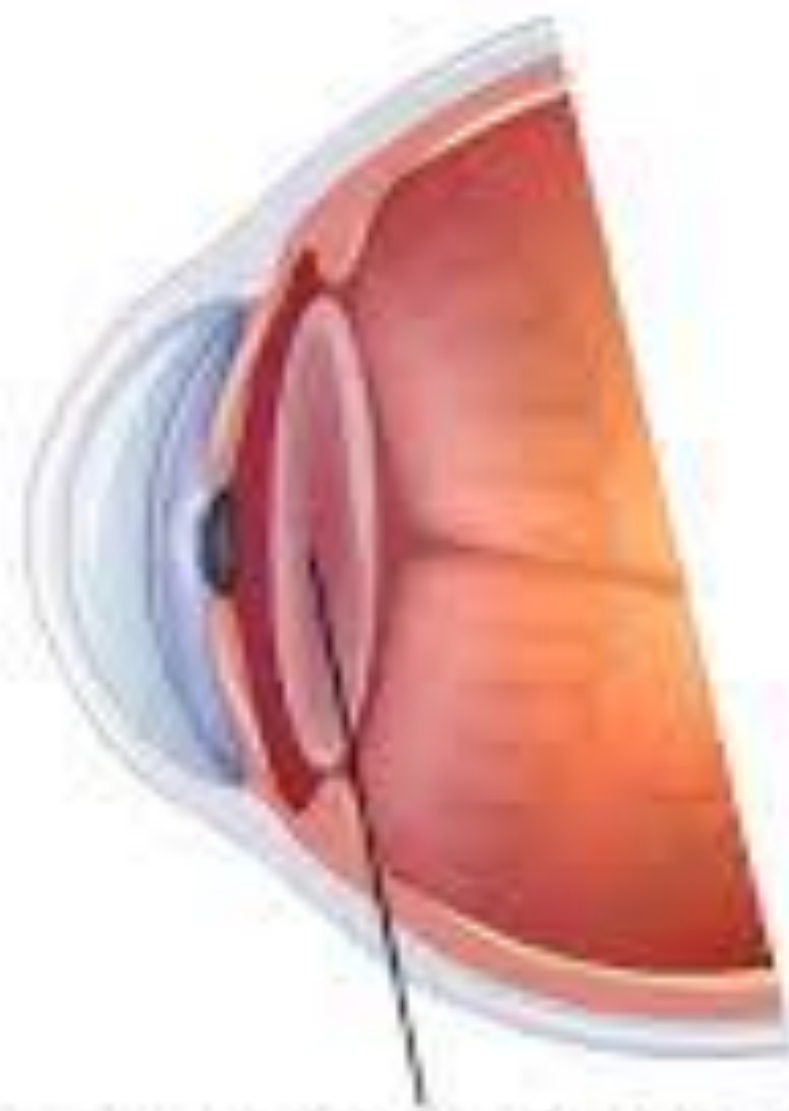
- LOSS OF THE EYE'S ABILITY TO FOCUS ON CLOSE OBJECTS
-
- IT IS NORMAL AGING PROCESSES AND IS NOT CONSIDERED TO BE AN EYE DISEASE.
-
- SYMPTOMS USUALLY NOTICEABLE BY AGE 40-45
-
- AND CONTINUE TO DEVELOP UNTIL THE PROCESS STABILIZES SOME 10-20 YEARS LATER.

CAUSES

AS INDIVIDUALS AGE THE LENS BECOMES LESS FLEXIBLE AND THE MUSCLES BECOMES LESS POWERFUL .WHICH LEAD TO DIFICULTY IN CHANGING THE SHAPE AND CURVITURE OF THE LENS WHICH RESPONSIBLE ON ITS POWER



Contracts for near focus



Lengthens for far focus

SYMPTOMS

SYMPTOM RESULT From IN ABILITY TO FOCUS ON OBJECTS CLOSE •
AT HAND .

INDIVIDUALS TYPICALLY HAVE DIFFICULTY READING SMALL •
POINTS SUCH AS TELEPHONE ,NEWSPAPER...

HEAD EACHE ,EYE STRAIN ,BLURRY VISION FOR CLOSE •
WORK

NEAR POINT AND FAR POINT

-
- NEAR POINT :-NEAREST POINT AT WHICH THE EYE CAN FOCUS AN OBJECT IMAGE ON THE RETINA .

-
- FAR POINT :-FAREST POINT FROM THE EYE WHICH AN OBJECT FOCUSED ON THE RETINA

-

NEAR POINT AND AGE

AGE (YEARS)	FAR POINT (CM)
10	7
20	10
30	14
40	20
50	40

-
-

AGE	AMPLIITUDE (D)	AGE	AMPLIITUDE (D)
10	14.00	45	3.50
15	12.00	50	2.50
20	10.00	55	1.75
25	8.50	60	1.00
30	7.00	65	0.50
35	5.50	70	0.25
40	5.00	75	0.00

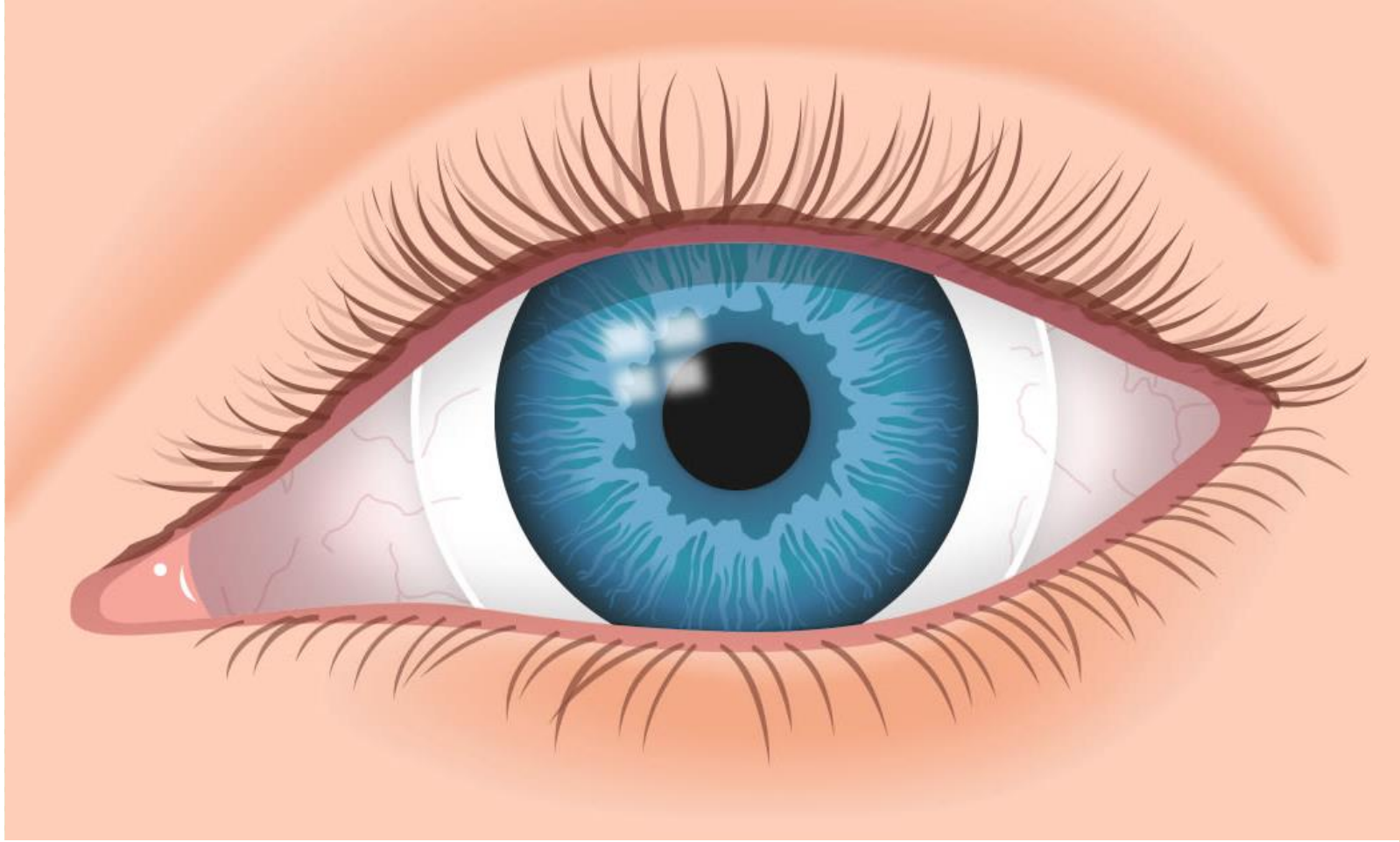
NEAR WORK

- COMFORTABLE VISION AT NEAR USES LESS THAN OR EQUAL TO HALF OF THE AVAILABLE AMPLITUDE OF ACCOMMODATION •
- NEAR WORK BECOMES DIFFICULT WHEN THE AMPLITUDE OF ACCOMMODATION IS LESS THAN 5.00 •

•

BASED ON AGE

AGE	ADD
40	0
45	+1.00
48	+1.25
50	+1.50
52	+1.75
55	+2.00
60	+2.25
65	+2.50



Scleral fixation contact lens

Scleral contacts

Scleral contacts are large-diameter gas permeable lenses specially designed to vault over the entire corneal surface and rest on the **sclera**. In doing so,

Scleral contacts



scleral lenses functionally replace the irregular cornea with a perfectly smooth optical surface to correct vision problems caused by keratoconus and other corneal irregularities.

types Of Scleral Contact Lenses

Scleral contacts are noticeably larger than standard gas permeable (GP) contacts and have a diameter equal to or greater than that of soft contact lenses. □

types Of Scleral Contact Lenses

The smallest scleral are approximately 14.5 □ mm in diameter, and the largest can be up to 24 mm.

types Of Scleral Contact Lenses

. Typically, lenses that are 18 mm or smaller are subcategorized as mini-scleral. □

The average human cornea is approximately 11.8 millimeters in diameter, □

types Of Scleral Contact Lenses

- . so even the smallest scleral contacts are designed to cover the entire corneal In comparison, □
- most conventional GP contact lenses are 9.0 to 9.5 mm in diameter and cover only 75 to 80 percent of the corneal surface. □



types Of Scleral Contact Lenses


Another category of gas permeable lenses bridges the size gap between conventional GP lenses and mini-scleral. These lenses, called cornea-scleral lenses, generally are approximately 13 to 15 mm in diameter. □

types Of Scleral Contact Lenses

More complex conditions, including advanced keratoconus, pathologically dry eyes or severe ocular surface disease that might require a large tear reservoir, often are fitted with larger scleral lenses, as they have more capacity to hold fluid or bridge large changes in corneal curvature.

Scleral Contact Lenses For Keratoconus



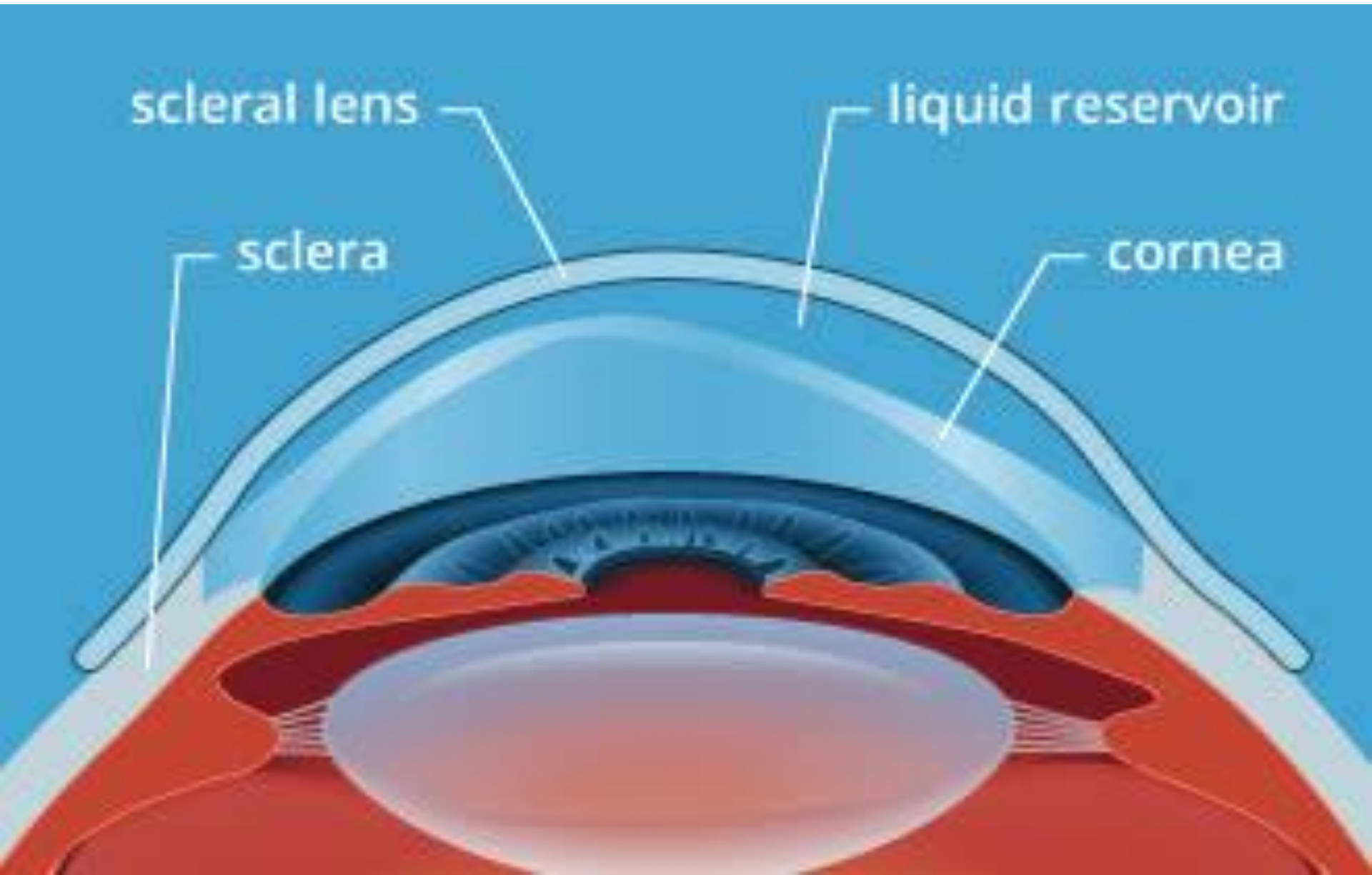
scleral lenses are designed to vault the corneal surface 
and rest on the less sensitive surface of the sclera, these
lenses often are more comfortable for a person with
keratoconus

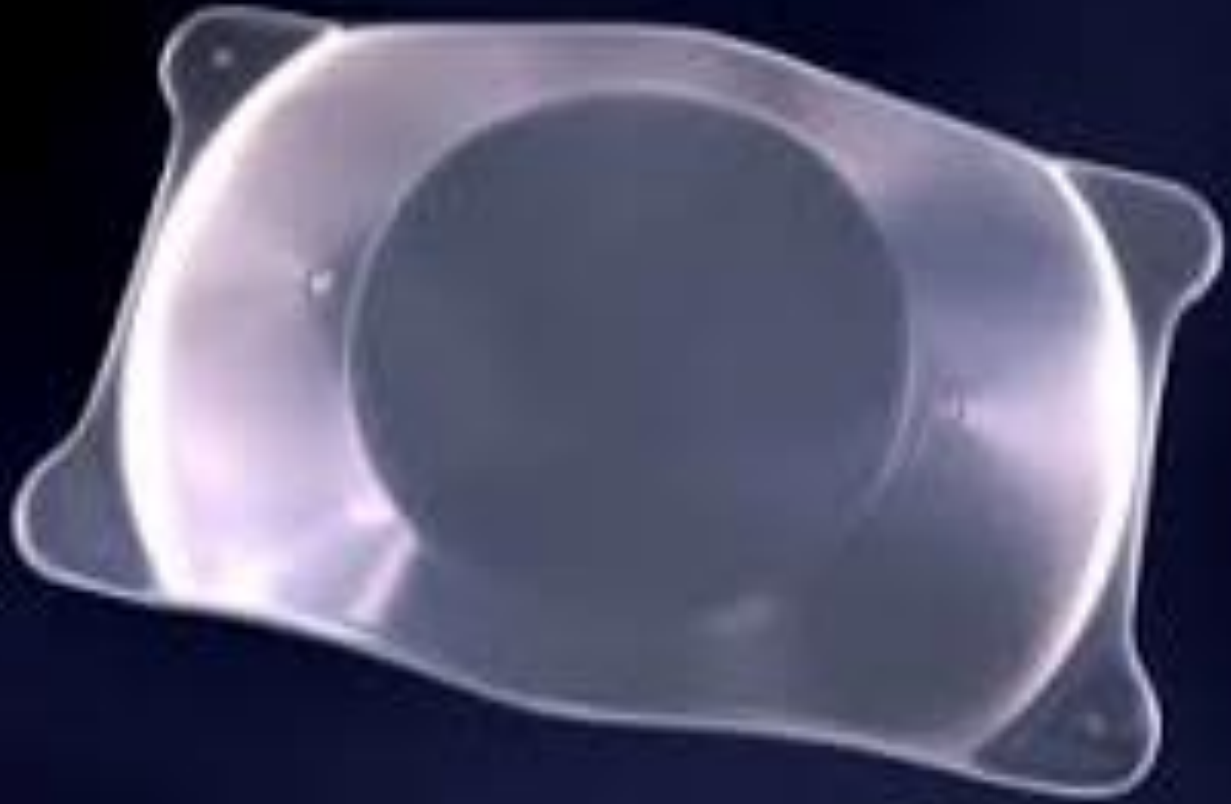
Scleral Contact Lenses For Keratoconus

In cases of early keratoconus, a standard GP lens may be used. However, if the lens does not center properly on the eye or moves excessively with blinks and causes discomfort, switching to a large-diameter scleral contact lens may solve the problem. □



Scleral Contact Lenses For Keratoconus





Intraocular lens

Intraocular lens

Intraocular lens (IOL) is a lens implanted in the eye as part of a treatment for cataract or myopia. If someone has a natural lens in the eye it is known as phakic and if someone has an artificial lens in the eye it is known as pseudo-phakic or false lens. These are implanted during cataract surgery,

Intraocular lens

IOLs usually consist of a small plastic lens with plastic side struts, called haptics, to hold the lens in place in the capsular bag inside the eye. .

Intraocular lens

IOLs were conventionally made of an inflexible material ([PMMA](#)), although this has largely been superseded by the use of flexible materials, such as [silicone](#) and [acrylic glass](#). Most IOLs fitted today are fixed monofocal lenses matched to distance vision.



Intraocular lens

other types are available, such as [multifocal IOLs](#) that provide the patient with multiple-focused vision at far and reading distance, and adaptive IOLs that provide the patient with limited visual accommodation. [Multifocal IOLs](#) can further be Multifocal IOLs, Trifocal IOLs

Intraocular lens



Intraocular lens



FOR PRECISE ASTIGMATISM CORRECTION

High rotational stability and
outstanding refractive results

Presmi IOL platform
TORIC



TORIC CONTACT LENS

Correction of refractive error



contact lenses are designed to improve vision, most commonly by correcting refractive error . This is done by directly focusing light so it enters the eye with the proper power for clear vision.

Correction of refractive error



A spherical contact lens bends light evenly in every direction (horizontally, vertically, etc.). They are typically used to correct myopia and hypermetopia .

Correction of refractive error



There are two ways that contact lenses can correct astigmatism: •

• first line with toric soft lenses that work essentially the same way as eyeglasses with cylindrical correction; a toric lens has a different focusing power horizontally than vertically, and as a result can correct for astigmatism.

Correction of refractive error



Second line by using a rigid gas permeable lens; since most astigmatism is caused by the shape of the cornea, rigid lenses can improve vision because the front surface of the optical system is the perfectly spherical lens. Both approaches have advantages and drawbacks.

Correction of refractive error

Toric lenses must have the proper orientation to correct for astigmatism, so such lenses must have additional design characteristics to prevent them from rotating out of alignment. This can be done by weighting the bottom of the lens or by using other physical characteristics to rotate the lens back into position, but these mechanisms rarely work perfectly, so some misalignment is common and results in somewhat imperfect correction, and blurring of sight after blinking rotates the lens.

Correction of refractive error

Toric soft lenses have all the advantages □ of soft lenses in general, which are low initial cost, ease of fitting, and minimal adjustment period. Rigid gas permeable lenses usually provide superior optical correction, but have become less popular relative to soft lenses due to higher initial costs, longer initial adjustment period, and more involved fitting

Correction of refractive error

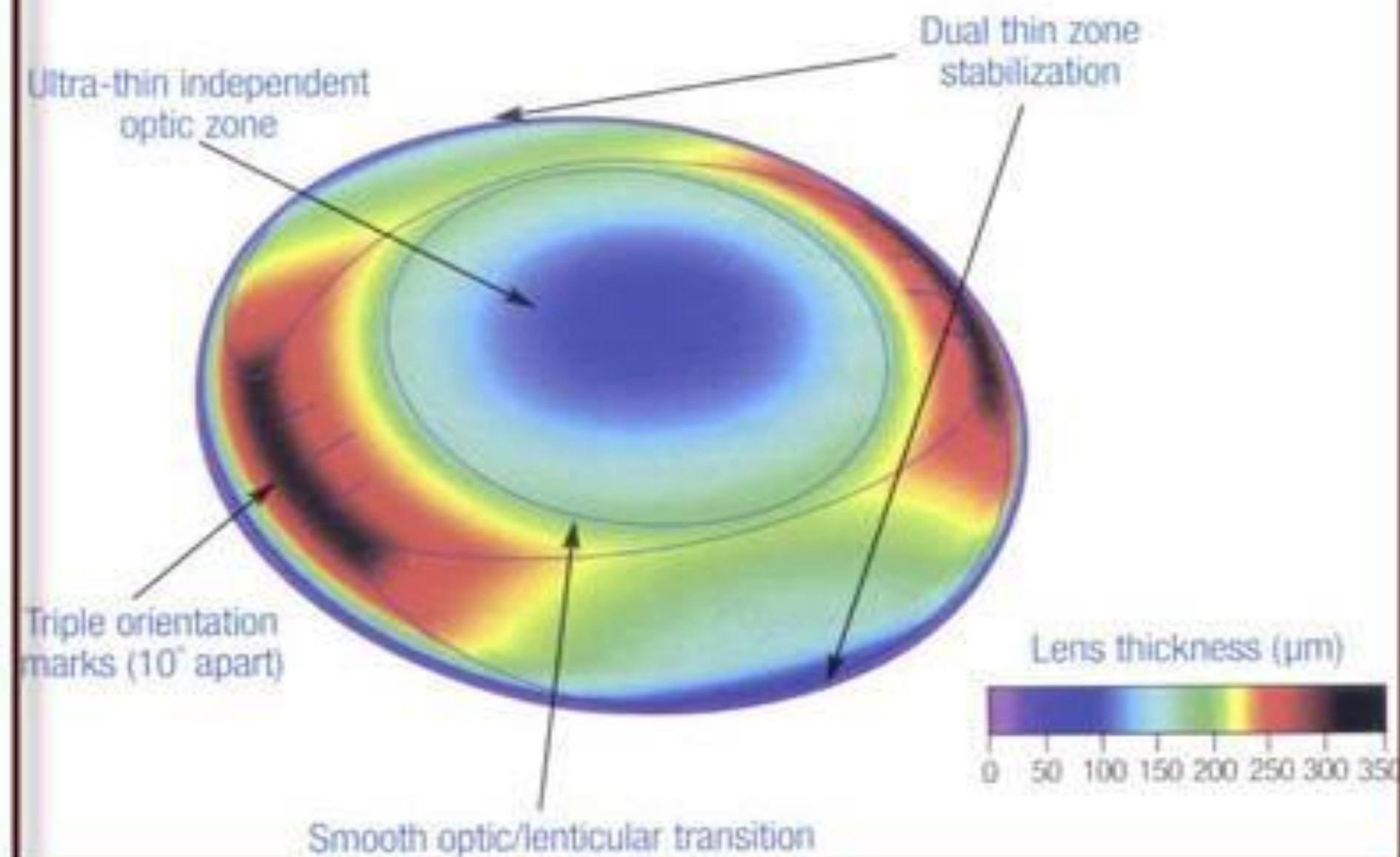
A **toric lens** is a lens with different optical power and focal length in two orientations perpendicular to each other. One of the lens surfaces is shaped like a "cap" from a torus , and the other one is usually spherical. Such a lens behaves like a combination of a spherical and cylindrical lens . Toric lenses are used primarily in eyeglasses , contact and intraocular lens to correct astigmatism. □

Different types of toric contacts

toric dailies and other disposable toric contact lens — also there is colored toric contact lenses. □

Toric contacts are also made with both soft and rigid gas permeable (RGP), or hard, lenses. RGP lenses can be better at staying put, but also involve a longer initial adjustment time and can be drier and more delicate. Soft toric contact lenses are more comfortable and easier to manage, but need extra care in fitting to stay in place. □

Toric Contact Lenses For Astigmatism





Keratoconus

Keratoconus

is a disorder of the eye that results in progressive thinning of the cornea. This may result in blurry vision, double vision, nearsightedness, irregular astigmatism , .and light sensitivity leading to poor quality-of-life . Usually both eyes are affected. In more severe cases a scarring or a circle may be seen within the cornea.

Keratoconus

Initially the condition can typically be corrected with glasses or soft contact lenses .. As the disease progresses, special contact lenses may be required . In most people the disease stabilizes after a few years without severe vision problems..

corneal collagen cross-linking to halt the progression of keratoconus . In some cases, when the cornea becomes dangerously thin or when sufficient vision can no longer be achieved by contact lenses due to steepening of the cornea, scarring or lens intolerance, corneal cross-linking is not an option and a corneal transplant may be required.

Signs and symptoms

early keratoconus often notice a minor blurring or distortion of their vision, as well as an increased sensitivity to light, and visit their clinician seeking corrective lenses for reading or driving.

At early stages, the symptoms of keratoconus may be no different from those of any other refractive defect of the eye. As the disease progresses, vision deteriorates, sometimes rapidly due to irregular astigmatism..

Signs and symptoms

Visual acuity becomes impaired at all distances, and night vision is often poor. Some individuals have vision in one eye that is markedly worse than the other eye. The disease is often bilateral, though asymmetrical. Some develop photophobia (sensitivity to bright light), eye strain from squinting in order to read, or itching in the eye , but there is normally little or no sensation of pain. It may cause luminous objects to appear as cylindrical pipes with the same intensity at all points □

Signs and symptoms

The classic symptom of keratoconus is the □ perception of multiple "ghost" images, known as monocular polyopia. This effect is most clearly seen with a high contrast field, such as a point of light on a dark background. Instead of seeing just one point, a person with keratoconus sees many images of the point, spread out in a chaotic pattern. This pattern does not typically change from day to day, but over time, it often takes on new forms. People also commonly notice streaking and flaring distortion around light sources.

Diagnosis

medical history, particularly the chief complaint . and other visual symptoms, the presence of any history of ocular disease or injury that might affect vision, and the presence of any family history of ocular disease. An eye chart,, is then used to determine the person's visual acuity. The eye examination may proceed to measurement of the localized curvature of the cornea with a manual keratometer.with detection of irregular astigmatism suggesting a possibility of keratoconus..

Diagnosis

Severe cases can exceed the instrument's measuring ability. A further indication can be provided by retinoscopy, in which a light beam is focused on the person's retina and the reflection, or reflex, observed as the examiner tilts the light source back and forth. Keratoconus is amongst the ophthalmic conditions that exhibit a scissor reflex action of two bands moving toward and away from each other like the blades of a pair of scissors □

Stages

Stage 1 ☐

Stage 2 ☐

Stage 3 ☐

Stage 4 ☐

Stage 1

- Eccentric steepening Induced myopia and/or astigmatism of ≤ 5.0 D .
- K-reading ≤ 48.00 D .
- Vogt's lines.typical topography .

Stage 2

- Induced myopia and/or astigmatism between 5.00 and 8.00 D .
- K-reading ≤ 53.00 D .
- Pachymetry ≥ 400 μm .

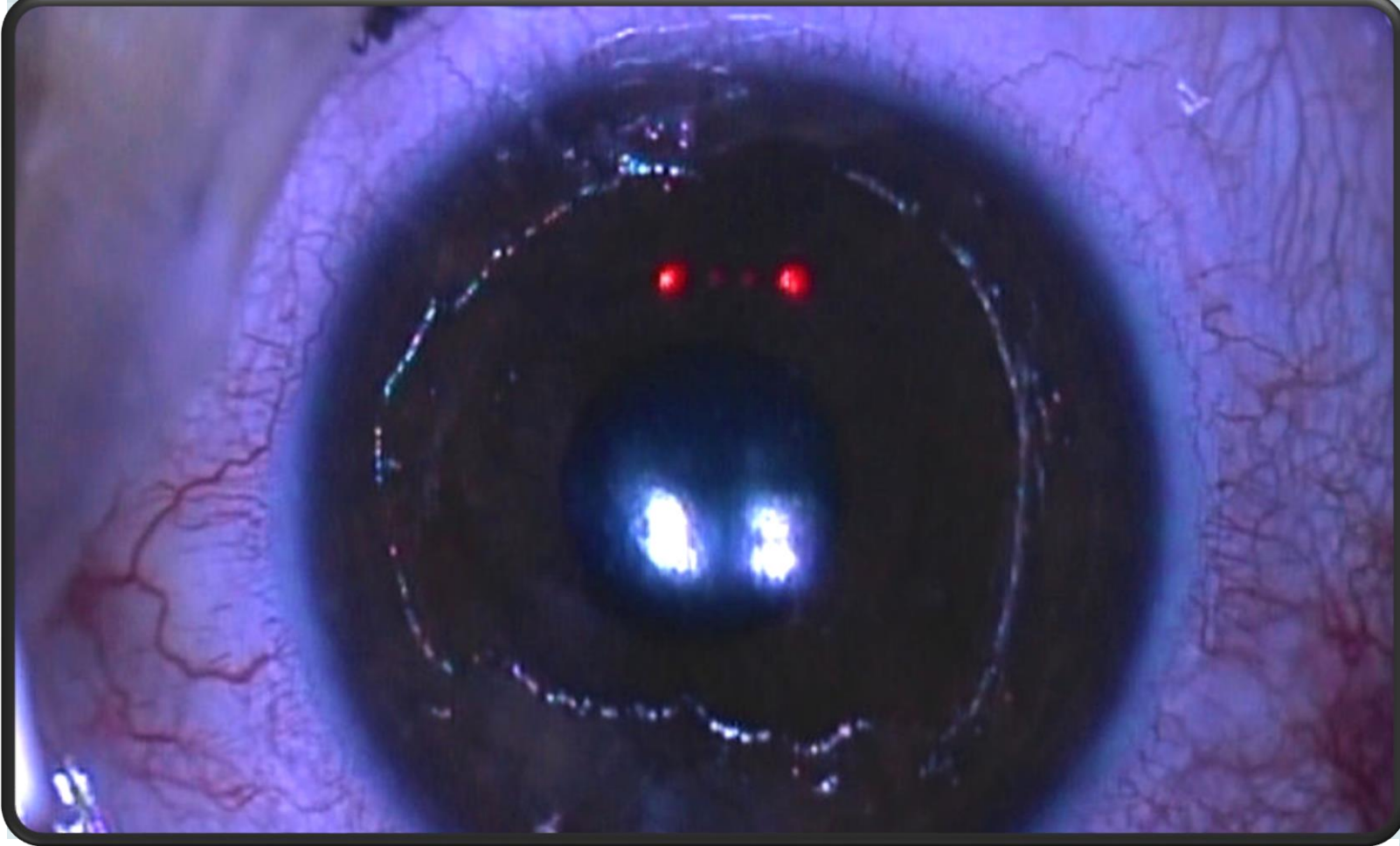
Stage 3

- Induced myopia and/or astigmatism between 8.01 and 10.00 D .
- K-reading > 53.00 D .
- Pachymetry 200 to 400 μm .

Stage 4

- Refraction not measurable .
- K-reading > 55.00 D .
- Central scars .
- Pachymetry ≤ 200 μm .





Ectasia

Post-LASIK ectasia

Post-LASIK ectasia is a condition similar to keratoconus where the cornea starts to bulge forwards at a variable time after LASIK, PRK, or SMILE corneal laser eye surgery. However, the physiological processes of Post-Lasik ectasia seem to be different from Keratoconus. The visible changes in the basal epithelial cell and anterior and posterior keratocytes linked with keratoconus were not observed in post-LASIK ectasia

Risk factors

Before corneal refractive surgery such as LASIK, and PRK, people must be examined for possible risk factors such as keratoconus.

Abnormal corneal topography compromises of keratoconus, pellucid marginal degeneration, is the most significant risk factor. Low age, low residual stromal bed (RSB) thickness, low preoperative corneal thickness, and high myopia are other important risk factors

Treatments

Treatment options include

- contact lenses,
- intrastromal corneal ring segments,
- corneal collagen cross-linking,
- corneal transplant.





Treatments

cross-linking is performed only after the cornea becomes distorted, vision remains blurry even though the disease is stabilised. As a result, combining corneal collagen cross-linking with LASIK ('LASIK Xtra') aims to strengthen the cornea at the point of surgery and may be useful in cases where a very thin cornea is expected after the LASIK procedure. This would include cases of high spectacle power and people with thin corneas before surgery.

Treatments

Definitive evidence that the procedure can reduce the risk of corneal ectasia will only become available a number of years later as corneal ectasia, if it happens, usually occurs in the late post-operative period. Some study show that combining LASIK with cross-linking adds refractive stability to hyperopic treatments and may also do the same for very high myopic treatments



Corneal cross linking

Corneal cross linking

Corneal cross linking is a procedure used to strengthen corneas. While corneal cross linking (sometimes referred to as CL or CXL)

the procedure was only recently approved for use. The Kellogg Eye Center is proud to be one of the few eye centers to offer this innovative new treatment.

Corneal cross linking

Corneal cross linking is a minimally invasive procedure that uses ultraviolet light and eye drops in order to strengthen the collagen fibers in the cornea. The procedure is used for patients with keratoconus, a condition in which the cornea grows thin and weak.

Corneal cross linking

During a corneal cross linking procedure, first ☐ apply riboflavin (vitamin B2) eye drops, and then shine a specific type of ultraviolet light directly onto your cornea. The eye drops consist of a substance conducive to photo enhancing, which enables cross linking to take place. The procedure causes new corneal collagen cross-links to develop. Those cross links cause the collagen fibrils to shorten and thicken, leading to a stiffer, stronger cornea.

Symptoms/Conditions

A healthy cornea resembles a clear, round dome. Located at the front of your eye, your cornea is what helps you to see, by focusing the light that enters through your eye.

Symptoms/Conditions

In people with keratoconus, however, the cornea ☐ doesn't have enough collagen fiber cross-links, which serve as a kind of structural support. Without those cross-links, the cornea begins to bulge out in a cone-like shape. That bulge results in blurred, distorted vision as the cornea weakens and thins. The condition, which can significantly impair vision, is difficult to treat with glasses or contact lenses. Severe cases of keratoconus may even require corneal transplant.

Risks

As with any other surgical procedure, there are risks involved with corneal cross linking. □

Because corneal cross linking includes the removal of the corneal epithelium (the thin layer on the cornea's surface), risks may include epithelial haze, corneal epithelium defect (disruption of surface cells), and delayed epithelial healing □

Risks

Other risks may include infectious keratitis, ☐ herpetic keratitis, corneal opacity, visual acuity, blurred vision, stromal scarring, and corneal striae (the appearance of fine white lines in your field of vision). Ulcerative keratitis, or severe inflammation of the eye, is another potential side effect.

Corneal cross linking is associated with a low rate ☐ of risks and complications..

Surgical Options

Until recently, patients with keratoconus had no ☐ treatment options available. Corneal cross linking is currently the only effective treatment for progressive keratoconus.

Post operative Expect

- You'll be awake during the procedure, which will take about an hour. •
- You'll be given a mild sedation and numbing anesthetic drops will be applied to your eyes. •
- Patients typically do not experience any discomfort during the procedure. •
- After the procedure, you may experience increased sensitivity to light, as well as general discomfort in the affected eye. Some patients describe that discomfort as a gritty, burning sensation. If you experience more severe pain, contact your doctor immediately. •
- Avoid rubbing your eyes for up to five days following the procedure •