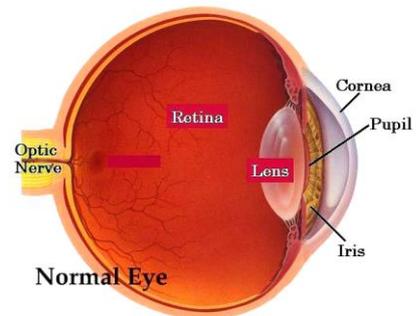


Cataract Surgery: Patient Information

How do the Eyes Work?

As light enters the eye, it first passes through the cornea—the clear “window” of the eye. Because the cornea is curved, the light rays bend (refract). The light then passes through the pupil to the lens. The iris—the colored portion of the eye—regulates the amount of light that enters the eye. This is achieved by the action of the muscles that cause the pupil to contract if there is too much light or to dilate if there is too little light. When the light hits the curved surface of the lens, it is refracted or bent even more so that it focuses properly on the retina. The retina then converts the light into electrical energy that passes through the optic nerve to the brain. This sequence may be summarized as follows.

- **Cornea** is the clear surface of the eye. Light rays refract as they pass through to the pupil.
- **Iris** is the colored portion of the eye. It regulates the amount of light that passes through the pupil.
- **Pupil** is the opening at the center of the iris. Light passes through the pupil to the lens.
- **Lens** refracts light in order to focus it properly on the retina.
- **Retina** converts light rays into electrical energy, which is passed to the optic nerve.
- **Optic nerve** serves as a pathway to the brain stem, which forwards the electrical energy to the occipital lobe.



Presbyopia

People with good vision and people who rely on the aid of glasses or contact lenses for distance vision adjust focus for close objects by altering the thickness of the crystalline lens, which functions as an intraocular lens. Age-related loss of elasticity to the crystalline lens and weakening of the muscle that adjusts the crystalline lens thickness, lead to a declined ability to adjust focus and makes it more difficult to see close objects. This condition is called presbyopia. Around the age of 45, most people begin having trouble reading newspapers or the display on cell phone screens and realize they have presbyopia as such inconveniences in daily routines increase in frequency.

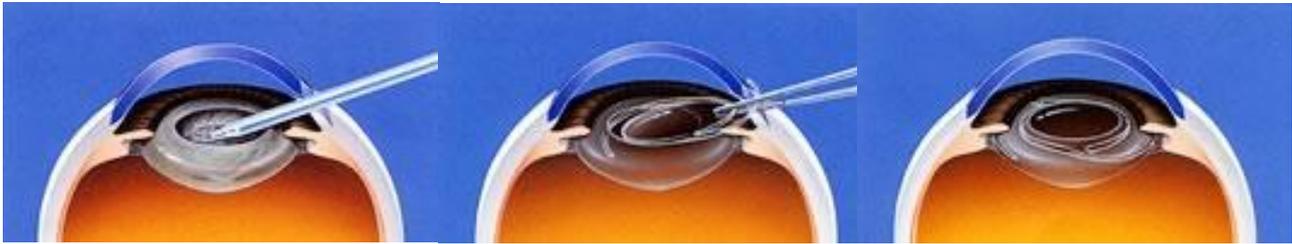
Cataract

In addition to presbyopia, age-related changes to the lens include a white opaque condition called cataract. In the initial stage, this lens opacity creates the scattered reflection of light, leading to glare even in patients who otherwise have good visual acuity. Some patients who think their vision is affected by presbyopia may also have cataracts. As the opacity increases, more light and images are blocked from reaching the retina, resulting in failing vision. This affects daily life and requires the surgical removal of the cataract.



Surgery

In cataract surgeries, the surgeon removes the opaque lens and implants a transparent artificial IOL. After receiving cataract surgery to one eye, the patient is observed for about one week before undergoing surgery to the other eye.



The opaque lens is removed.

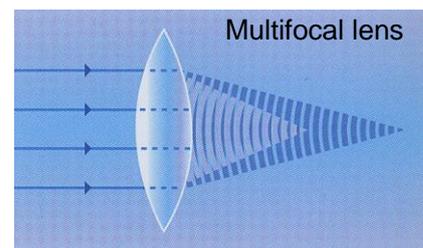
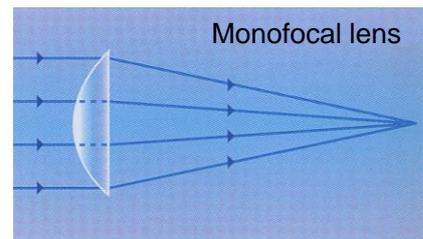
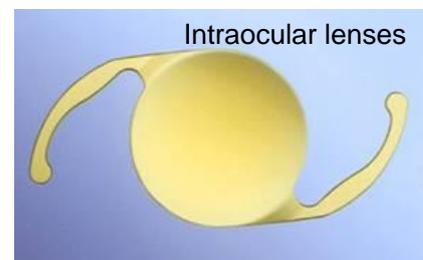
The IOL is inserted into the lens capsule.

The surgery is finished.

Kinds of IOLs

There are two types of IOLs: monofocal IOLs and multifocal IOLs.

Monofocal IOLs: They offer no focal adjustment function and have only a single focus point. Patients implanted with monofocal IOLs have the same presbyopic condition as before the surgery. If the implanted lens is set for better distant vision, then near vision suffers. Conversely, if the lens' focus point is set for near distances to allow reading books or computer screens, a patient will have trouble watching TV or recognizing acquaintances when passing them on the street. Therefore, eyeglasses will be required after surgery.



Multifocal IOLs: They are designed based on a cutting-edge optical theory for distributing light in such a manner that provides multiple points of focus, thereby eliminating the dependence on eyeglasses in daily life. However, for very far away landscapes or fine print, eyeglasses may still be needed.

| | Monofocal IOLs | Multifocal IOLs |
|---------------|--|---|
| Advantages | <ul style="list-style-type: none"> ● Setting the focus for far distances achieves clear far vision. | <ul style="list-style-type: none"> ● In daily life, after undergoing surgery patients will be able to see both far and near to some extent. ● Multifocal IOLs also offer the potential for correcting astigmatism. |
| Disadvantages | <ul style="list-style-type: none"> ● Eyeglasses will be needed because setting the focus for far distances results in poor near or intermediate distance vision. ● Astigmatism will persist. | <ul style="list-style-type: none"> ● It may result in poor Intermediate distance vision. ● Better vision may be achieved with the addition of eyeglasses where needed. ● Night may feel darker and patients may experience light blurring such as halos and glare. |

Indication: Am I a Candidate?

IOLs are suitable for cataracts.

IOLs are not suitable for the following conditions.

- Repeated endophthalmitis
- Intraoperative complication such as continuous bleeding, vitreous prolapse and posterior capsule rupture
- Uncontrolled glaucoma
- Proliferative diabetic retinopathy
- Pregnant or nursing

Multifocal IOLs are suitable for pupils that are larger than 2.5mm in size in bright conditions in addition to the above.

Procedure From Examination To Surgery

- 1. First examination:** During this examination, the doctor will determine whether you are a suitable candidate for IOL surgery.
- 2. Final examination:** To order the appropriate IOLs, repeat axial length measurements are conducted. During this visit, we will take a sample of your blood, and this sample will be subjected to laboratory examination for infectious diseases.
- 3. Surgery:** If you wear contact lenses, you can use them the day before the surgery. You should not wear them on the day of the surgery. After administering local anesthesia, the surgeon makes an incision at the limbus of the cornea, from which surgical instruments are inserted to remove the opaque lens. Subsequently, the surgeon inserts an IOL to conclude the surgical procedure.
- 4. Post-surgery:** Postoperative exams are scheduled periodically at one day, one week, two weeks, one month, two months, three months, six months, one year, two years, three years, five years and every year.

Potential Complications

Similar to other surgical procedures, there are risks associated with this surgery. The possible complications are as follows:

- **Pain, foreign body sensation or sting:** Most patients experience slight pain or discomfort, particularly during the first few days after the surgery. Please use pain reducing medications according to the instructions provided.
- **Subconjunctival bleeding:** Subconjunctival bleeding (bleeding of the white of the eye) may occur. This may lead to reddening of the eyes and will take approximately two weeks for the blood to be absorbed.
- **Infection:** Infection is a potential complication that follows all surgical procedures. You should not touch your eyes or eyelids on the day of the surgery. In order to minimize the risk of postoperative infection, it is critical to precisely follow the prescribed postoperative medication regimen.
- **Elevated eye pressure:** The postoperative transient inflammation may lead to elevated pressure inside the eyes. In order to minimize the risk of postoperative elevation in eye pressure, it is critical to precisely follow the prescribed postoperative medication regimen.

- **Undercorrection or overcorrection:** IOL surgery is not a 100% accurate procedure. It is not possible to accurately predict how your eyes will respond to the treatment. If undercorrection or overcorrection is significant, you may need to wear glasses or contact lenses. Eventually, additional refractive surgery may be necessary to achieve your best vision after more than three months.
- **Inadequate position of the lens:** The lens may be dislocated from the center of the pupil. Usually, this does not affect vision. However, in case of major dislocation, retreatment may be required.
- **Cloudiness of posterior capsule:** The posterior side of the capsule may become cloudy. The cloudiness may progress enough to significantly decrease your vision. In a few cases, the removal of the cloudiness of posterior capsule with laser may be required.
- **Rupture of lens capsule:** In rare cases, the lens capsule may be ruptured during the surgery. So the surgery may be prolonged or the IOL may not be inserted.
- **Other complications:** These include the loss of endothelial cells, uveitis (inflammation of the middle layer of the eye), endophthalmitis (swelling of the intraocular cavity), macular degeneration (loss of tissue in the center of the retina), expulsive hemorrhage, distortion of the IOL and others.

In addition, the possible complications of multifocal IOLs are as follows:

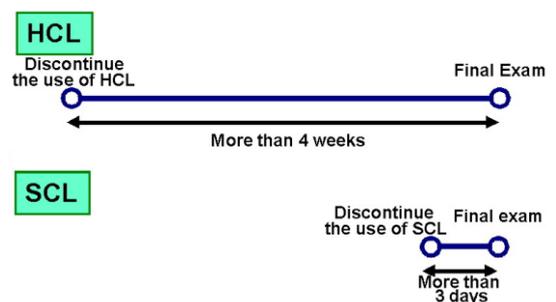
- **Night vision problems such as halos, glare, starbursts, and light sensitivity:** Vision may be somewhat blurred and there could be mild glare and/or halos at night.
- **Insufficient accommodation:** Insufficient distant and near vision may occur. In a few cases, glasses may be necessary for good distant or near vision. LASIK refractive surgery is also possible after three months.

Precautions

Instruction for Patients Wearing Contact Lenses

Contact lenses alter the shape of the cornea. Therefore, people who wear contact lenses will need to stop wearing them for a period of time before the final examination, depending on the type of contact lenses used. Following the below instructions will ensure the proper measurement of the refractive error in patients.

- Hard or gas permeable lenses (HCL) should not be used for 4 weeks prior to the final examination.
- Soft contact lenses (SCL) should not be used for 3 days prior to the final examination.
- Any kind of contact lenses can be used the day before the surgery. Please do not use them on the day of the surgery.



Precautions Before the Surgery

From 3 days before the surgery:

- Please use eyedrops according to the instructions provided.

On the day of the surgery:

- Please do not put on any makeup (except skin toner/emulsion).
- Please do not wear any sweater or garment made from mohair or a similar yarn.
- Please avoid any outfit that exposes your shoulders or bring a jacket with you (the operating room is chilly).
- Please do not operate a vehicle.
- Please do not drink alcohol.
- Please do not put on any perfume, hair dressing, or strongly scented cream when you come to the clinic for the surgery.
- Please remove earrings before the surgery.
- If you have long hair, please tie it to the side before the surgery.
- Please bring the informed consent document with your signature.
- Please inform the doctor regarding any drug allergies that you have experienced.

Precautions After the Surgery

Please follow the instructions mentioned below in order to prevent postoperative infection.

For the day of the surgery:

- Please do not touch your eyes or eyelids.
- Please do not take a bath, shampoo your hair, or wash your face. Instead, please wipe your face gently with a wet towel. You may take a shower, but please avoid wetting your face. After examination by the physician on the day subsequent to that of the surgery, in case there are no complications, you may take a bath, shampoo your hair, or wash your face.
- Please be sure to come to the clinic on the day following the surgery.
- Please use eyedrops according to the instructions provided.

During the first week after the surgery:

- Please use protective sunglasses outdoors.
- Please do not wear eye makeup.

During the first month after the surgery:

- Please use protective eye patches while sleeping.
- Please do not participate in sports.
- Please prevent water or sweat from entering your eyes and avoid vigorous rubbing of your eyes.

Remaining Myopia, Hyperopia, and Astigmatism After Cataract Surgery

If you have astigmatism before the surgery, you may not have good vision due to it. Furthermore, there may be slight myopia, hyperopia, and astigmatism after the surgery. If you need better vision, you can have LASIK surgery to reduce the remaining refractive errors after three months. LASIK is a common refractive surgery in order to produce clearer vision and it is used to correct myopia, hyperopia, and astigmatism. The cost of LASIK on one eye is 130,000 JPY including consumption tax.