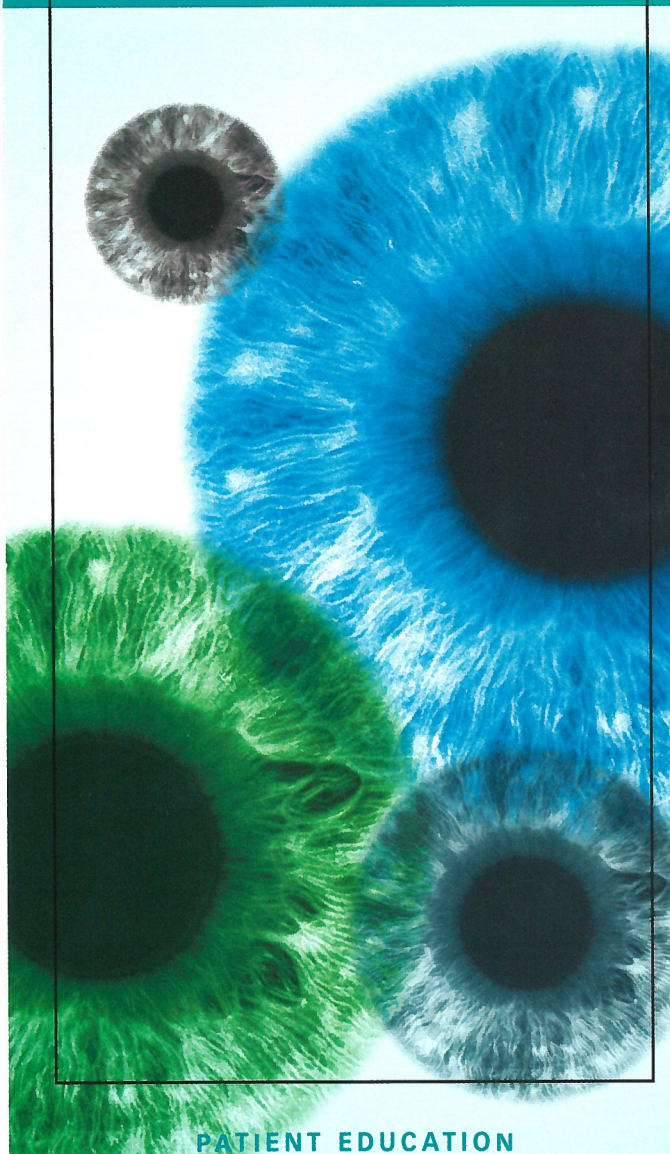




AMERICAN ACADEMY
OF OPHTHALMOLOGY
The Eye M.D. Association

Multifocal and Accommodative IOLs

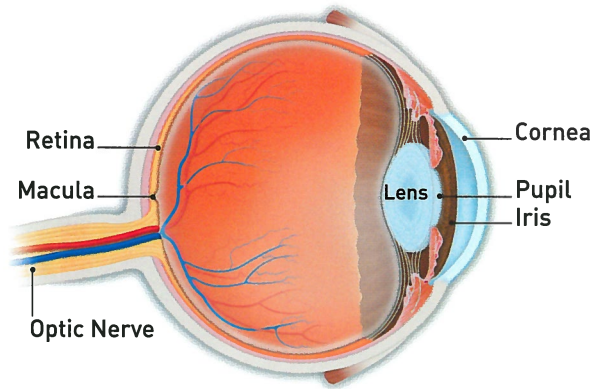
A Closer Look



PATIENT EDUCATION

How we see the world around us

For us to see clearly, light rays enter our eyes through the clear **cornea**, **pupil** and **lens**. These light rays are focused directly onto the **retina**, the light-sensitive tissue lining the back of our eyes.



The retina converts light rays into impulses that are sent through the optic nerve to our brain, where they are recognized as images. Seventy percent of the eye's focusing power comes from the cornea and 30 percent from the lens. While problems with the cornea (the clear front window of your eye) or the lens may prevent light from focusing properly on the retina, a **refractive error** may prevent us from seeing clearly in certain situations, despite having a clear cornea and lens.

Today, many people are choosing to correct their refractive errors with options other than eyeglasses or contacts.

Various forms of refractive surgery — such as LASIK — improve vision by permanently changing the shape of the cornea to redirect how light is focused onto the retina. In some cases, instead of reshaping the cornea, the eye's natural lens is either replaced or enhanced by an implanted **intraocular lens (IOL)** that helps correct vision.

The role of multifocal and accommodative IOLs in clearer vision

The eye's lens, which contributes to your focusing power, has four primary functions:

Transparency. To provide a clear medium through which light rays from an object can reach your retina.

Optical. To focus a sharp image of an object onto the retina.

Anatomic. To create a functional barrier between the front (anterior) and back (posterior) segments of the eye.

Accommodation. To vary the eye's refractive power, providing clear images of objects over a wide range of near, far and intermediate distances.

For people with cataracts, the lens of the eye becomes cloudy. Light cannot pass through it easily and vision is blurred. Cataract surgery is used to remove the cloudy lens and replace it with a clear IOL.

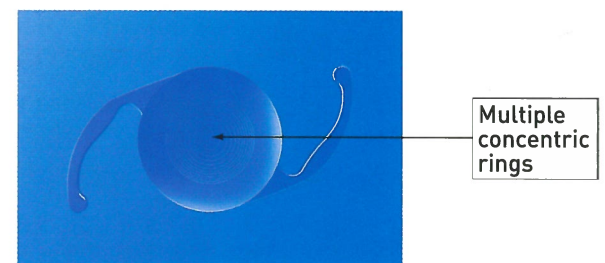
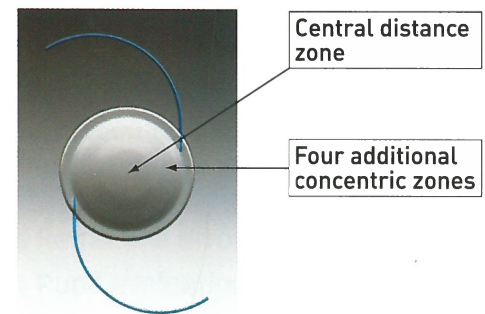
In some cases, people without cataracts who want to reduce or eliminate their need for glasses and who may not be candidates for LASIK may choose to have an IOL implanted in a procedure called refractive lens exchange (RLE). This procedure may be used to correct moderate to high degrees of myopia (nearsightedness), hyperopia (farsightedness) and presbyopia (the inability to focus at near distances with age).

When the natural lens is removed during cataract surgery, or removed as a form of refractive surgery, IOLs are inserted to take the place of the natural lens. IOLs are artificial lenses surgically implanted in the eye, replacing the eye's natural lens. These lenses help your eye regain its focusing and refractive ability.

The most common type of implantable lens is the monofocal, or fixed-focus lens, which is intended to give clear vision at one distance. In order to see clearly at all ranges of distances, one is required to wear glasses or contact lenses.

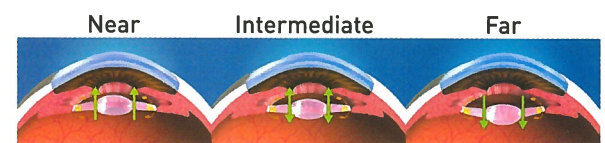
Other types of lenses which are gaining in popularity are the **multifocal** and **accommodative** lenses. These IOLs may be used to treat myopia, hyperopia and presbyopia and may diminish the need for glasses, contact lenses, or both to see clearly at near and far distances.

A **multifocal IOL** has several rings of different powers built into the lens. The part of the lens (ring) you look through will determine if you see clearly at a far, near or intermediate distance (this is sometimes called pseudoaccommodation).



Two types of multifocal lenses

An **accommodative IOL** is hinged to work in coordination with the eye muscles. The design allows the accommodative lens to move forward as the eye focuses on near objects, and move backward as it focuses on distant objects.



The accommodative lens is hinged to allow the eye to focus on near, intermediate and distant objects.

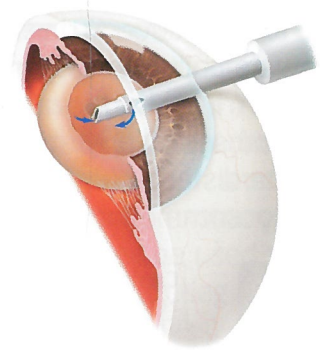
How the IOL is implanted

The IOL is implanted in an outpatient surgical procedure that takes approximately 15 to 20 minutes.

In addition to a preoperative eye exam, measurements of the eye are taken to give the surgeon the necessary information to perform the procedure. These measurements include:

- Refractive error measurement;
- Pupil evaluation and size measurement;
- Measurement of the curvature (keratometry) and overall shape of the cornea (topography);
- Measurement of the length of the eye from the cornea to the retina (called an A-scan);
- Calculations to determine the correct power of lens (IOL) to use.

After the eye is numbed with topical or local anesthesia, one to three small incisions are made close to the edge of the cornea. A tiny, high-frequency ultrasound instrument is inserted into the eye to break up the center of the eye's natural lens. The natural lens is then gently vacuumed out through one of the incisions. The IOL is folded and inserted through the same incision that was used to extract



The natural lens is gently vacuumed out through an incision.



The IOL is then folded and inserted through the same incision.

the natural lens and placed into the "capsular bag" that originally surrounded the natural lens. After the procedure, these incisions are usually "self-sealing," requiring no stitches. Once the multifocal or accommodative IOL is implanted, your eye can focus on near, intermediate and far distances.

It should be noted that the focusing ability of the lens may not be fully realized for six to eight weeks after the procedure. In addition, your eye must relearn how to focus on objects at various distances in order to see clearly. Patients who are pilots, night drivers or those who spend a lot of time in front of the computer may not be good candidates for the multifocal or accommodative IOLs. Patients who are intolerant of a small amount of glare, halos, or both around lights, especially at night, may not be good candidates for these types of lenses.

Some of the risks and possible side effects of IOL implantation include:

- Overcorrection or undercorrection (with a possible need for a retreatment);
- Infection;
- Increased floaters or retinal detachment;
- Dislocation of implant;
- Halos and glare;
- Decreased contrast sensitivity;
- Clouding or hazing of a portion of the IOL (called posterior capsular opacification);
- Blurred vision if patient suffers from dry eye;
- Possible need for additional surgery to fine-tune the IOL prescription;
- Loss of vision.

Talk with your ophthalmologist about your vision needs

While multifocal or accommodative IOLs do offer some people an alternative to dependence on glasses or contact lenses, they are not recommended for everyone. You may not be a good candidate for these IOLs if you are generally satisfied with glasses or contact lenses and unwilling to accept the uncertainty in the outcome of the surgical procedure. Even after the procedure, certain people may still need to wear glasses or contacts, especially for very fine print.

Most people are happy with their multifocal IOLs and the decreased need for glasses. However, a small percentage of patients are bothered by halos, glare and a change in their quality of vision. Rarely, some people may request that their surgeon remove the multifocal or accommodative IOL and replace it with a monofocal IOL.

Surgery, contacts and glasses each have their benefits and drawbacks. The best method of correcting your vision should be decided after a thorough examination and discussion with your ophthalmologist (Eye M.D.). Discuss your needs and lifestyle with your ophthalmologist to determine the best procedure for you.

The American Academy of Ophthalmology is an organization of nearly 30,000 ophthalmologists (Eye M.D.s) dedicated to preserving eye health and sight.

American Academy of Ophthalmology

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*Scan this code with your
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