

Tell us who you are,
and we'll tell you which kind of
intraocular lens is right for you!



During phacorefractive surgery, the ophthalmologist will replace your natural crystalline lens with an artificial one, commonly called an "intraocular lens." The power and type of lens will be carefully chosen in order to reduce your reliance on glasses or contact lenses.

There are different types of intraocular lens and, during the evaluation, your optometrist and surgeon will tell you of the advantages of each. Thanks to a detailed questionnaire on your lifestyle, they will be able to recommend the choice that best meets your needs. **It is important to understand, under certain conditions, some patients will still require glasses after surgery to perform certain tasks.**

 **IRIS**
OPHTHALMOLOGY CLINIC



THE OPTIONS: SEEING FAR, SEEING UP CLOSE, OR BOTH!

Several types of intraocular lens are available:

- monofocal;
- accommodative;
- multifocal (or pseudo-accommodative).

Your optometrist and ophthalmologist will present you the advantages and disadvantages of each of these options. They will help you to choose one that is appropriate for your needs and the condition of your eyesight.



MONOFOCAL LENSES

The monofocal lens provides a single focus point. It allows the eye to **see well at a single distance**. This type of lens is most often used in phacorefractive surgery, mainly in cases of cataract surgery.

Monofocal lenses are most suitable for people who are willing to wear glasses or who have an anomaly in one or both eyes.

Your optometrist and ophthalmologist can offer you different correction options using monofocal lenses:

- both eyes corrected for distance vision;
- both eyes corrected for intermediate vision or near vision;
- monovision: one eye corrected for distance vision and the other for near vision.

Both eyes corrected for distance vision

If you decide to have both eyes corrected for distance vision, you will enjoy the best quality vision for your distance vision activities. It's what nature should have given you from the beginning!

(e.g., daytime/evening driving, watching television, going to the movies, playing sports, etc.).

However, you will have to wear glasses in order to correct your intermediate and near vision. Progressive lenses may be necessary, even if you don't need to wear them in order to see at a distance.

(e.g., reading books, working on the computer, cooking, reading the time on your watch, putting on makeup, shaving, performing do-it-yourself work, etc.).



Both eyes corrected for intermediate vision or near vision

If you are already short-sighted and are used to remove your glasses to read, your ophthalmologist will be able to select an intraocular lens power that will conserve part of your short-sightedness. This correction method will allow you to remain independent as regards near vision. You will, however, have to wear glasses to correct your distance vision. **Progressive lenses may be necessary**, even if you do not need to wear them to see things up close.

Monovision: one eye corrected for distance vision and the other for near vision

If it is necessary to operate on both eyes, you can choose to have one (dominant) eye corrected for distance vision and the other (non-dominant) for near vision. This method provides an **option that can reduce your dependence on corrective lenses**.

Monovision may be simulated by contact lenses before surgery. It is not appropriate for everyone, because it **requires compromises in vision quality**:

- good vision at two specific distances (one for each eye), but it may not be perfect under certain circumstances;
- reduction in the stereoscopic vision (3D vision) leading to a decrease in the ability to judge distances;
- possible perception of halos around lights in the evening

Corrective lenses may be necessary to equalize vision in both eyes to improve your comfort when performing lengthy tasks requiring precision (e.g., driving your car at night, working on the computer, reading small print, etc.).

ACCOMMODATIVE LENSES: MODIFIED MONOFOCAL

The accommodative lens is similar to the single focus lens as it has only one focal point. The difference is that thanks to flexible material and (haptic) support, this lens may be moved forwards or backwards in the eye by muscular action. This movement allows the focal point of the intraocular lens to move forwards or backwards, depending on if you are looking up close or far away. The quality of vision at each of the distances depends on how effective the muscles are in making the lens move.

This type of lens has not been approved unanimously by the scientific community, and its effectiveness has not yet been demonstrated by a sufficient number of studies.

The following lenses currently on the market use the accommodative principle:

- Tetraflex (distributed by Lenstec)
- Crystalens (not available at IRIS)

MULTIFOCAL LENSES (or pseudo-accommodative)

The multifocal lens uses an optical principle that allows separation of light into several focal points. This principle allows “**simultaneous vision**” at more than one distance at the same time, in the same eye.

When the eye captures the different focal points, it selects the one that allows it to best see the object viewed at a certain distance. This image selection process is not natural for the eye and requires a period of “neuronal adaptation” which may vary depending on individuals. In fact, the visual system must “learn” to see through another form of vision. Adaptation to multifocal intraocular lenses generally takes 3 to 6 months, after surgery has been performed on both eyes.

This neuronal adaptation is comparable to the capacity to adapt to new eyeglasses with progressive lenses. Some individuals adapt easily within a few days, while others take more time or, in rare cases, never manage to adapt.

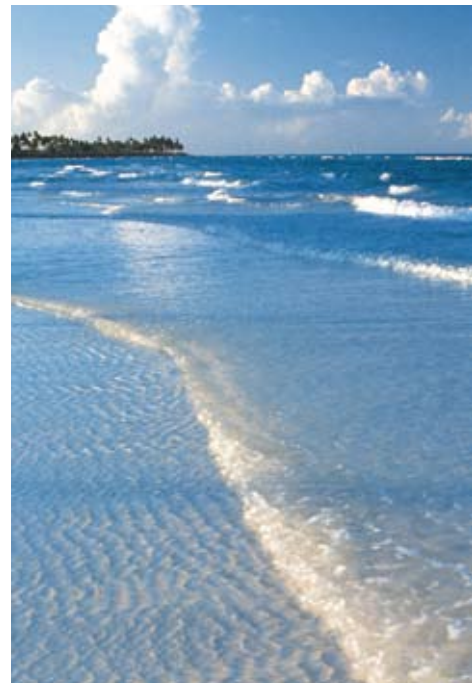
Some multifocal contact lenses employ the principle of simultaneous vision and, prior to surgery, may help you understand or simulate the effect of a multifocal intraocular lens.

Advantages

Multifocal lenses may suit you if you highly wish not to wear corrective lenses for both distance and near vision.

Your ophthalmologist cannot guarantee you will never need to wear glasses after surgery, even if you choose the multifocal lens. Regardless of what kind of lens is used, **it is quite likely that you will occasionally need to use corrective lenses for certain precise tasks, under certain conditions.**

In general, patients who opt for the monofocal lens will remain dependent on their glasses, either occasionally or most of the time, in about 70% of cases. Those who opt for the multifocal lens will remain **dependent on their glasses**, either occasionally or most the time, in about **15% of cases.**



Compromises can be necessary

Multifocal lens optics separate light into two or more focal points and create visual effects to which you will have to adapt:

- perception of **halos** or stretching around lights at night or during periods of dimmed light;
- slight **reduction in sensitivity to contrasts** under certain lighting conditions (e.g., ability to identify a person crossing the street in fog or at night);
- good vision in general, but may not be perfect in all circumstances.

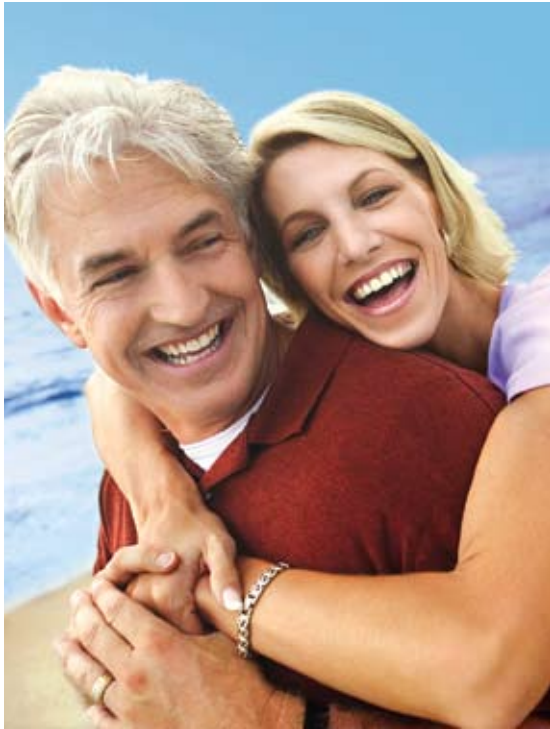
Most of these effects are **irreversible** and cannot be corrected with glasses. However, the discomfort caused by the side effects tends to diminish over time, thanks to the phenomenon of neuronal adaptation (One gets used to it!).

Corrective glasses may improve quality of vision when a residual defect is present (myopia, hypermetropia or astigmatism).

Are you a good candidate for multifocal lenses?

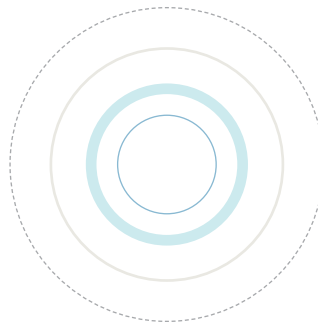
The multifocal lens might **not suit you if:**

- you are a perfectionist, careful about detail and/or you have unrealistic expectations;
- you find it difficult to adapt to change;
- you are subject to depression;
- your work requires that you drive often at night;
- your activities and leisure pursuits depend on excellent nocturnal vision;
- you are an airplane pilot (amateur or commercial);
- you have always been sensitive to light;
- you wish to be certain about the results of the surgery;
- you are happy with your glasses.



Despite all of your goodwill, the ophthalmologist might decide that the multifocal lens is **not the ideal solution if:**

- you show a high degree of astigmatism;
- you are short-sighted (far-sighted people respond better to this type of lens);
- you have an ocular disease that reduces the quality of vision in one or both eyes;
- you have amblyopia (lazy eye) or you suffer from strabismus (squint);
- you are unsuitable for a touch-up by laser surgery (LASIK, PRK or Epi-LASIK);
- you have already undergone vision correction by laser or radial keratotomy.



TYPES OF MULTIFOCAL LENS

Currently, there are several different types of multifocal lenses on the market, supplied by different manufacturers.

At IRIS, your ophthalmologist will ensure that you can choose from products which meet the highest standards of effectiveness and safety.

Diffraction Lenses (ReSTOR, Tecnis Multifocal)

Diffraction lenses act like bifocal lenses. They separate the light into two distinct focal points: one for distance vision (Group C) and the other for near vision (Group A).

This optical effect is created by a series of concentric rings, laid out like the seats in a Greek amphitheater (rising in steps). These rings act as prisms, diffracting rays of light and separating them into two focal points. The diffraction rings explain the occurrence of a phenomenon typically associated with multifocal lenses, namely the presence of **halos around lights** in the evening.

The pupil diameter interferes very little with the diffraction. The two focal distances are almost always available, regardless of the level of ambient lighting.

Very little light is devoted to intermediate vision (Group B). Therefore the lens provides **good vision** at a short distance (**20-35 cm**). The quality of vision is not as good when objects are moved back to an intermediate distance (arm's length), as in computer work, for instance.

The following lenses currently on the market use the diffraction principle:

- AcrySof ReSTOR (distributed by ALCON)
- Tecnis Multifocal (distributed by AMO)

Refractive Lenses (ReZoom)

Refractive lenses consist of multiple ring-shaped areas, each of which has its own power. The set of rings allows the light rays to be focused simultaneously at different distances. The eye selects the clearest image, depending on the distance of the object being viewed.

In general, the central ring is devoted to distance vision, which makes this type of lens particularly suitable for distance vision (Group C). Thanks to the peripheral rings, the distribution of light rays also allows intermediate (Group B) and near vision (Group A).



Access to various focus areas depends partly on pupil diameter.

- **Where there is less light, the pupil dilates.**
Thus the light crosses all of the focus areas and allows near, intermediate and distance vision. In darkness, the perception of these three areas explains the phenomenon of **halos around lights**, typical of multifocal lenses.
- **Where there is a large amount of light, the pupil contracts.**
The light is thus limited to the central area (the area intended for distance vision). In order to provide access to near vision, the lighting must therefore be controlled so as to promote pupil dilation. For example, you might need to wear sunglasses or reading glasses if you read in the sun.

The refractive lens looks a lot more like a multifocal lens than a bifocal lens. It is the lens of choice for those who attach more importance to intermediate vision than to detailed near vision.

The following lens currently on the market uses the refractive principle:

- ReZoom (distributed by AMO)



ReSTOR
Diffractive lens



Tecnis
Diffractive lens



ReZoom
Refractive lens

GETTING USED TO YOUR NEW VISION





The ophthalmologist may suggest implanting the same type of lens in both eyes or combining two different types of lens. This decision will be made **according to your needs**, in order to reduce your dependence on corrective glasses.

Both eyes are never operated on in the same session. A minimum period of one week is allowed between the two surgical procedures so that you may become familiar with the lens implanted in the first eye before operating on the other one.

It should be noted that neuronal adaptation may take more time when both eyes do not perceive the same optical effects. You might have to wait longer before feeling perfectly comfortable with your vision.

Be patient!

THE OPTIONS AT A GLANCE

Type of IOL	Advantages	Disadvantages
 <p>Monofocal</p> <ul style="list-style-type: none"> • 2 eyes for distance 	<ul style="list-style-type: none"> • Excellent distance vision; • Few bothersome light effects; • Good nocturnal vision or under conditions of dimmed light. 	<ul style="list-style-type: none"> • Glasses must be worn at all times for activities requiring intermediate and near vision.
 <p>Monofocal</p> <ul style="list-style-type: none"> • Monovision (one eye for distance, one eye for near vision) 	<ul style="list-style-type: none"> • Allows freedom from glasses for distance and near vision; • Vision in both eyes may be equalized by wearing glasses for tasks requiring precision. 	<ul style="list-style-type: none"> • Reduction in stereoscopic vision (depth perception); • Moderate halos around lights; • Good vision, but may not be perfect under certain circumstances; • Sometimes back-up glasses are necessary for precision or long-lasting tasks.
 <p>Diffraction Multifocal</p> <ul style="list-style-type: none"> • ReSTOR • Tecnis Multifocal 	<ul style="list-style-type: none"> • Allows freedom from glasses when viewing both at a distance and up close; • Good vision for small print up close (20-35 cm); • Maintains binocular vision (2 eyes together). 	<ul style="list-style-type: none"> • Perception of halos around lights; • Slight reduction in contrast sensitivity; • Limited intermediate vision (arm's length); • Sometimes back-up glasses are required, mainly for intermediate vision.
 <p>Refractive Multifocal</p> <ul style="list-style-type: none"> • ReZoom 	<ul style="list-style-type: none"> • Allows freedom from glasses for distance, intermediate, and near vision; • Maintains binocular vision (2 eyes together). 	<ul style="list-style-type: none"> • Perception of halos around lights; • Slight reduction in contrast sensitivity; • Sometimes back-up glasses are needed, mainly for near vision; • Near vision is difficult in intense light.