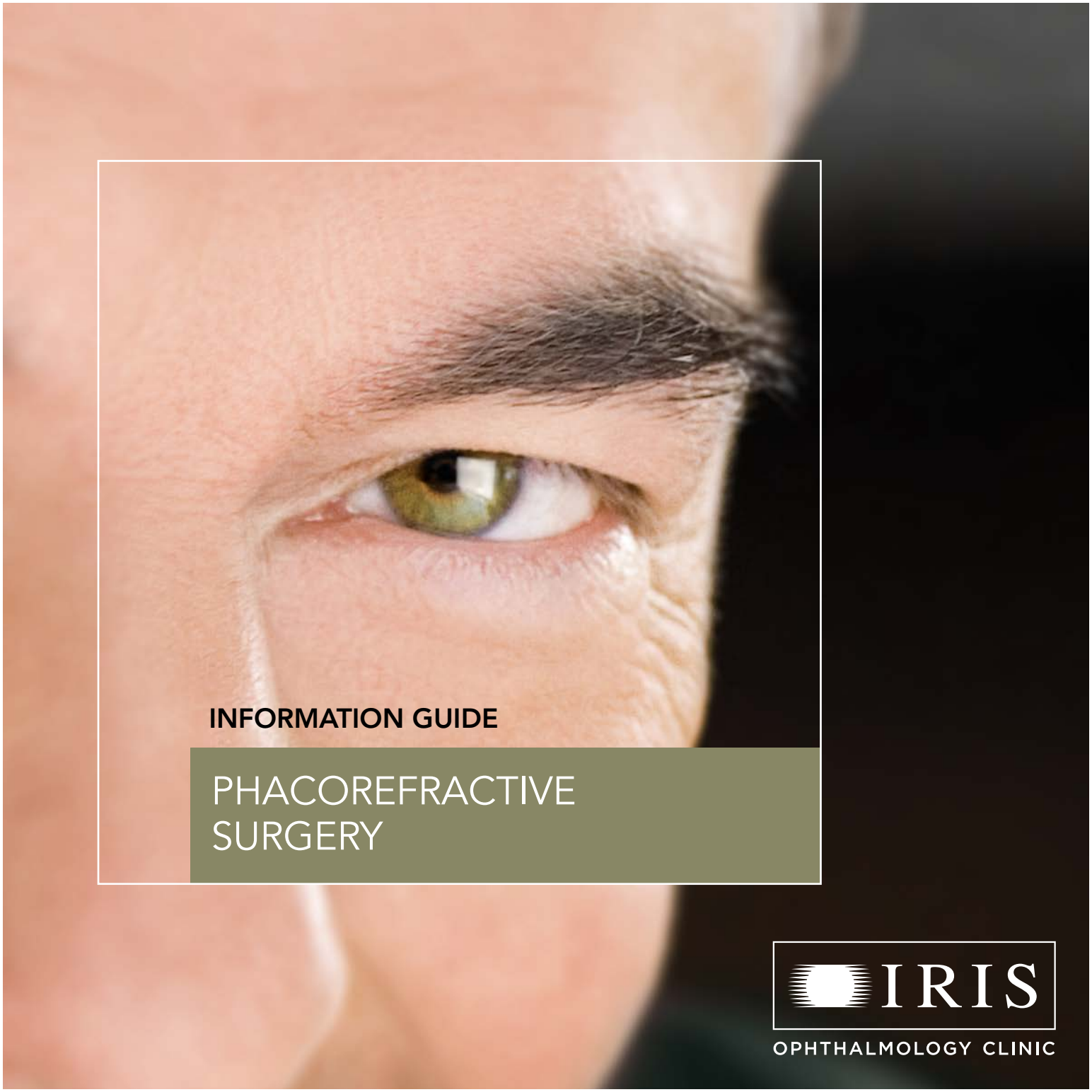

INFORMATION GUIDE

PHACOREFRACTIVE SURGERY

IRIS

OPHTHALMOLOGY CLINIC

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INTRAOCULAR LENSES

ACCREDITATION CANADA • AGRÉMENT CANADA
ACCREDITED • AGRÉÉ

Over the past few years, the IRIS Ophthalmology Clinic has committed to the accreditation process of Accreditation Canada. The purpose of this review was to assess the performance of our Clinic against National Standards of Excellence, our Continuous Quality Improvement Program as well as the safety in care and services we provide.

The IRIS Ophthalmology Clinic achieved the highest accreditation award:

“ACCREDITED WITH EXEMPLARY STANDING”

PHACOREFRACTIVE SURGERY

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Please note that the masculine gender is used throughout only to simplify the text.

PRE-OPERATIVE ASSESSMENT

Chapter 1

PRE-OPERATIVE VISIT

During your pre-operative consultation, you will meet with an optometrist and an ophthalmologist. They will perform a complete assessment of your vision and health of your eyes to determine whether or not you are a candidate for phacorefractive surgery (replacement of your natural crystalline lens with an artificial intraocular lens). If so, they will propose the type of correction that best meets your needs and lifestyle.

Our surgeons and the team of qualified optometrists, opticians and nurses who assist them will provide you with clear answers to all your questions in an effort to help you make a well-informed decision.

1.1 WHAT TO EXPECT DURING THE PRE-OPERATIVE CONSULTATION

The pre-operative assessment takes approximately **2 hours**.

To ensure the accuracy of your pre-operative measurements, **you must plan to stop completely wearing your contact lenses before the assessment**:

- a minimum of 7 days for soft daily-wear lenses (removed at night);
- a minimum of 14 days for toric (to correct astigmatism) or extended-wear (worn overnight) soft lenses;
- a minimum of 4 weeks per 10 years of wear for gas permeable semi-rigid lenses.

Your ophthalmologist could ask you not to wear your contact lenses for a longer period of time, if deemed necessary.

Bring with you the complete list of all medications you are currently taking. This list will be provided to you by your pharmacist at no extra charge.

Bring with you your most recent glasses.

Anaesthetic eye drops will be used for some procedures. These drops will produce a numbing sensation on the surface of the eye for approximately 15 minutes. Over the next few hours, your eye may seem dry and/or your vision may be slightly blurred.

Dilation eye drops will be instilled in order to perform the detailed assessment of the back of the eye (retina). Pupil dilation increases sensitivity to light, creates a blurring of distance vision and temporarily reduces the ability to focus on nearby objects.

The dilation effect generally lasts 4 to 6 hours. It varies from one person to another and according to iris pigment. It is not recommended to drive once your pupils have been dilated. Ideally, you should wear **sunglasses** and **arrange to have someone take you home afterwards.**

The pre-operative evaluation does not commit you to anything. Professional fees may apply for performing the examination and/or for writing up the ophthalmological assessment report. The IRIS Ophthalmology Clinic will deduct these fees from the cost of your surgery if you decide to go ahead with the procedure, as the case may be.

N. B. **No prescription** for glasses or contact lenses will be provided following the pre-operative assessment.

1.2 PLANNING YOUR APPOINTMENT

Please contact the IRIS Ophthalmology Clinic to schedule the date of your pre-operative assessment:

> by calling **450-688-6574** or toll-free at 1-877-656-IRIS (4747);

> by emailing us at **info.ophtalmo@iris.ca**

The IRIS Ophthalmology Clinic is strategically located for easy access at **3030 boulevard Le Carrefour, suite 1105** (11th floor) across the Carrefour Laval shopping mall.

With your consent, your eyecare professional will be able to send us a summary of your optometric file **by fax at 450-688-9516** or toll-free at 1-877-674 8256. For this purpose, the IRIS Ophthalmology Clinic could forward a reference form to him prior to the date of your pre-operative assessment. Your file, however, is not a substitute for the detailed exam that will need to be performed at the IRIS Ophthalmology Clinic.

Out of consideration for the other patients and for your own comfort during the assessment, **please arrange to be accompanied by someone to look after your young children**, as the case may be.

In order to better serve you, **please let us know if you are a person with a mobility impairment**.

Chapter 2

A GOOD UNDERSTANDING OF THE EYE HELPS BETTER UNDERSTAND THE SURGERY

The eye can be compared to a camera. The front part of it is composed of two natural lenses; the **cornea**, located in front of the iris, and the **natural crystalline lens**, located behind it.

The **iris**, which gives the eye its distinctive colour, acts as a diaphragm by controlling the amount of light that penetrates the eye through the **pupil** (black middle portion). In bright light the pupil contracts; in dim light it dilates.

The cornea is like a round window. Its curvature confers to it a certain focal power, comparable to a camera lens.

The crystalline lens is clear and elastic at birth. It is contained in a membrane called the **capsule**, which is attached to muscles.

When these muscles contract, the crystalline lens bulges out in the shape of a magnifying glass. This action, referred to as **accommodation**, allows the eye to adjust its focus on objects located at different distances. It is like the zoom on a camera lens.

Rays of light pass through the cornea and then the crystalline lens to converge on a focal point. After crossing a gelatinous substance called the **vitreous**, all of these points of light form an image that is captured by the **retina**. The retina lies at the back of the eye like a film in a camera. The image is then transmitted to the brain in the form of nerve impulses along the **optic nerve**.

N. B. Any disease or anomaly of the eye can prevent someone from having perfect vision even after undergoing surgery performed under the best possible conditions.

2.1 EMMETROPIA

An eye is considered to be **emmetropic** or **free of refractive errors** when the rays of light that pass through the cornea and the crystalline lens converge on a single clear point directly on the retina. In this case, the focus is perfect for **distance vision**. At that moment, the crystalline lens is at rest.

2.2 DISTANCE VISION AND ITS DEFECTS

As the eye grows, defects in distance vision can arise that will need to be corrected by glasses and/or contact lenses.

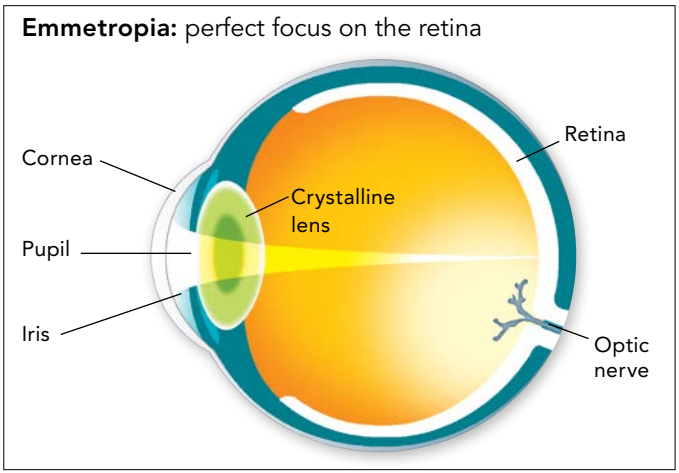
During phacorefractive surgery, the ophthalmologist replaces your natural crystalline lens with an artificial one, commonly referred to as an *intraocular lens* (IOL), in the aim of reducing your reliance on glasses or contact lenses.

2.2.1 MYOPIA (NEARSIGHTEDNESS)

If the **eye is too long** or the **cornea too steep**, the rays of light converge **in front of the retina**. The result is **blurred vision primarily at a distance**.

If you are myopic and remove your glasses, your can see better up close but have difficulty distinguishing objects further away.

NORMAL ANATOMY OF THE EYE



2.2.2 HYPEROPIA (FARSIGHTEDNESS)

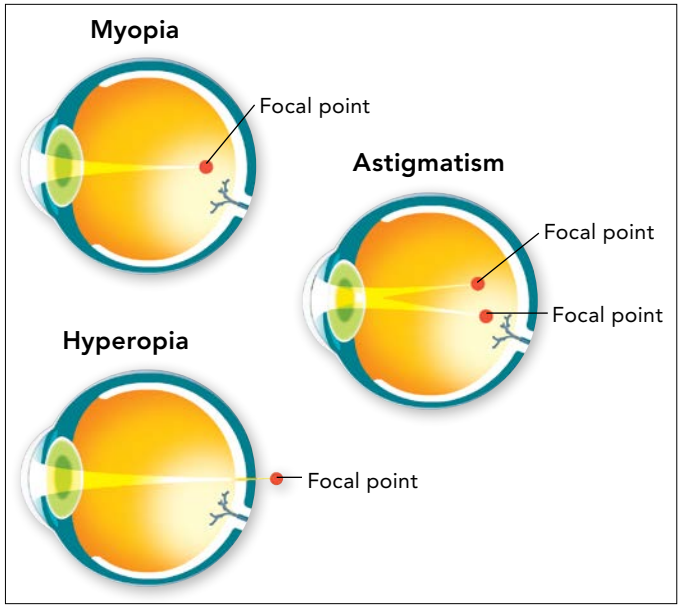
If the **eye is too short** or the **cornea too flat**, the rays of light converge **behind the retina**. The crystalline lens must then make a constant effort to adjust the focus of the image on the retina. This explains why certain people who are hyperopic have good distance vision for many years. However, this accommodative effort results in eyestrain, **primarily when looking up close**.

With age and the loss of elasticity of the crystalline lens, latent hyperopia will slowly begin to manifest itself with intermediate vision and distance vision becoming increasingly blurred.

2.2.3 ASTIGMATISM

Astigmatism occurs when the **cornea is shaped like a "football"**, i.e. more curved on one axis and flatter on the opposite axis. Therefore, it results in two different focal points in the eye, either in front of or behind the retina (myopic astigmatism or hyperopic astigmatism). This type of visual defect can cause an uneven blur around an object or convey the impression of double vision.

VISUAL DEFECTS



2.3 PRESBYOPIA: A LOSS OF FUNCTIONALITY OF THE CRYSTALLINE LENS WITH AGE

Throughout life, the crystalline lens gradually loses its natural elasticity. This elasticity, referred it as accommodation, allows us to alternate between far and near vision. **The loss of accommodation (presbyopia) is part of the natural aging process of the eyes and affects everyone over 40**. It continues into our 50s, at which time practically all of the elasticity of the crystalline lens disappears.

2.3.1 REVEALING SIGN

If you wear glasses to correct distance vision, certain signs allow you to recognize the onset of presbyopia:

> you have a tendency to hold reading material at arm's length;

> your eyes tire or your vision blurs when you do close-up work for an extended period of time;

> **if you are nearsighted, you will tend to remove your glasses to see more clearly up close**.

Myopia: Don't be fooled by the myth of eternal youth!

The crystalline lens is the structure of the eye most affected by the advancing years. Myopes tend to believe that they do not become presbyopic around age 40 because they can adjust their vision at any time, effortlessly, **by simply removing their distance-vision glasses**. In fact, their visual defect serves as an escape hatch allowing them to mask their presbyopia.

IRIS suggests some **innovative solutions** which are offering you freedom from glasses, both in distance and near vision even after 40 years old!

Chapter 3
WHAT IS A CATARACT?

A cataract is defined as a loss of transparency of the crystalline lens. Its effect can be compared to looking through a frosted or tinted window. As the opacity may affect only a limited zone of the crystalline lens at first, the condition can go unnoticed. However, it tends to worsen gradually, resulting in deterioration of the quality of your eyesight.

Most cataracts are related to aging and generally appear after the age of 50. It is estimated that half the people 65 to 75 years of age have cataracts. The proportion jumps to 70% among those over 75.

If we live long enough, **we all eventually develop cataracts!**

Although the vast majority of cataracts are related to the natural process of aging, some can have other causes (e.g., exposure to ultraviolet rays, medication, trauma, etc.).

To date, no medication, dietary supplement or exercise has been shown to be effective in preventing or treating cataracts. **Surgery is the only definitive treatment for this condition.**

3.1 SYMPTOMS OF A CATARACT

Cataracts usually occur in both eyes, but it is not uncommon for one eye to be more affected than the other.

Cataracts generally evolve slowly and manifest themselves through various symptoms:

> impression of looking through a veil;

> sensitivity to light;

> glare;

> perception of halos or stretching around lights at night;

> frequent prescription changes in eyeglasses and/or contact lenses;

> temporary improvement in near vision without eyeglasses;

> colours appear faded or different;

> double vision in one eye or ghosting around objects.

N. B. Some of these symptoms can also be associated with other ocular conditions. This is why it is important to **consult your eyecare professional annually or as soon as you perceive a significant change in your vision.** It will thus be possible to detect the problem early on.

3.2 WHEN SHOULD A CATARACT BE OPERATED ON?

Phacorefractive surgery can be considered the moment cataracts affect your daily activities (e.g., driving, reading, watching television, etc.). It becomes all the more relevant if your optometrist can no longer attenuate your symptoms with new corrective glasses.

There is generally no danger in putting off phacorefractive surgery until you feel ready. However, with modern surgical techniques, it may be more difficult to remove the crystalline lens when a cataract is well advanced. **The old belief that cataracts should be allowed to "mature" before being removed no longer holds.**

Based on your symptoms, your ophthalmologist will determine with you when it would be best to operate on your cataract. He will assess the risks of surgery and the likelihood of improving your vision through the procedure.

3.3 REPLACING A CLEAR CRYSTALLINE LENS… WHY NOT?

Replacing a clear crystalline lens is the same procedure as cataract surgery. However, its primary objective is to diminish your reliance on corrective glasses.

Phacorefractive surgery becomes an alternative to correct your vision if:

> the other surgical methods for correcting vision are not right for you (e.g., laser surgery);

> you already present signs of presbyopia (40 years of age or over);

> you would like to correct your presbyopia in addition to your myopia, hyperopia or astigmatism;

> you have the beginnings of a cataract or you are predisposed to cataracts on account of your age (55 years of age or over);

> you have already been operated on for a cataract in one eye and would like to equalize the vision in both eyes;

> you would like to correct your vision in a way that will last over time.

You stand to benefit from a **stabilizing effect** by replacing your natural crystalline lens with an artificial intraocular lens that will not age or deteriorate over time. **Hence, this surgical procedure keeps you from developing or redeveloping a cataract for the rest of your life!**

You would be benefitting from a tried and tested technology that has proven effective and safe with millions of people who have undergone this cataract surgery in the past 30 years.

Chapter 4

BE CLEAR WITH YOUR OPHTHALMOLOGIST!

Thanks to a detailed assessment of your vision and the health of your eyes, the ophthalmologist will be able to determine the relevance and likelihood of success of phacorefractive surgery.

The choice of this surgical technique and the choice of the type of intraocular lens will depend closely on other key factors:

> your personal and family history of general and ocular health problems;

> your needs and lifestyle;

> your expectations and personality.

To avoid complications and foreseeable disappointments, it will be of capital importance that you provide the ophthalmologist with all the pertinent information to prepare your surgery.

4.1 EYE HEALTH QUESTIONNAIRE

The ophthalmologist will need to know your ocular history in order to:

> decide on the type of intraocular lens to implant and calculate its power accurately;

> decide on the surgical method to use;

> assess the risks during and after the surgery;

> estimate the likelihood of you obtaining a satisfactory quality of vision after the surgery.

The main ocular conditions, diseases or anomalies that can influence the outcome of your surgery include, but are not limited to, the following:

> prior ocular surgery to correct your myopia, hyperopia or astigmatism;

> direct eye or orbit trauma;

> retinal tear or detachment;

> anomaly of the cornea;

> anomaly of the retina or optic nerve;

> infection or inflammation;

> amblyopia (lazy eye) or strabismus (turned eye).

	Yes	No
> Do you wear glasses and/or contact lenses?		
> Are both your eyes corrected for distance vision?		
> Do you use glasses to see up close when you wear your contact lenses?		
> Do you have one eye corrected for distance vision and the other for near vision (monovision)?		
> Are the contact lenses you wear of the multifocal type?		
> Do you or a member of your family suffer from an ocular disease or anomaly?		

4.2 GENERAL HEALTH QUESTIONNAIRE

Are you on medication?

Bring with you the complete list of all medications you are currently taking. This list will be provided to you by your pharmacist at no extra charge.

Do not leave out any detail as certain medications can require the surgeon to modify his surgical technique, your pre-operative preparation or your post-operative eye drop dosage.

Unless specifically instructed by the surgeon, you will not need to interrupt your medication prior to the pre-operative assessment or to the surgery.

Do you suffer from a systemic disease?

Unless you suffer from a particular condition, you will not need to provide a medical report from your doctor. However, it is critical that the ophthalmologist be informed of any condition relative to your general state of health that could:

> bother you during the procedure;

> necessitate specific precautions during the procedure;

> interfere with the safety of the surgical team;

> prevent taking certain medications during or after the procedure;

> affect the post-operative healing process.

4.3 TELL ME WHO YOU ARE AND I WILL TELL YOU WHICH KIND OF INTRAOCULAR LENS IS RIGHT FOR YOU!

During the pre-operative assessment, the optometrist and the surgeon inform you of the advantages and disadvantages of the different types of intraocular lens. They will be able to advise you on the choice best suited to your needs and lifestyle. The power and the type of lens will be carefully chosen to ensure your diminished reliance on glasses and/or contact lenses.

It is important to understand that several patients will still need to **wear glasses after the surgery** in order to **perform certain tasks under certain conditions**.

4.3.1 5 "OPTICAL ZONES"

Think about your daily activities.

Determine how much the fact of wearing glasses and/or contact lenses interferes with your activities.

near vision ⟵ ⟶ distance vision

Zone 1 (30 to 50 cm)	**Zone 2 (60 cm to 1.20 M)**	**Zone 3 (1.80 to 6 M)**	**Zone 4 (6 to 30 M)**	**Zone 5 (30 M and +)**
> newspaper articles > telephone directory > geographic map > sewing/knitting	> computer screen > newspaper headlines > reading menus > reading price tags > cooking	> indoor activities > watching TV > housekeeping	> daytime outdoor activities > daytime driving > playing golf > reading road signs	> night-time outdoor activities > night-time driving > going to the movies > stargazing

Group A (near vision)

Group B (intermediate vision)

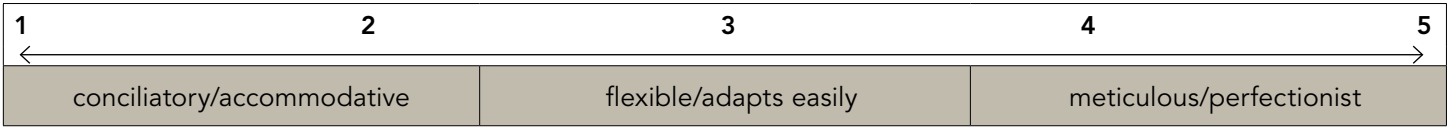
Group C (distance vision)

Which group is most important to you?
(choose only one)

- ☐ > Group A : zones 1 and 2
- ☐ > Group B : zones 2 and 3
- ☐ > Group C : zones 3, 4 and 5

4.3.2 LIFESTYLE QUESTIONNAIRE

On the scale below, circle the personality trait that best describes you.



Are you interested in seeing far without glasses after the surgery?

☐ > I prefer not to wear glasses for distance vision.

☐ > Wearing glasses for distance vision does not bother me.

Are you interested in seeing close without glasses after the surgery?

☐ > I prefer not to wear glasses for near vision.

☐ > Wearing glasses for near vision does not bother me.

Which of the following activities most accurately reflects your work or daily activities?

> I look at small objects/fine print close up.
Examples: knitting/sewing, jewellery making, telephone directory.

☐ infrequently ☐ occasionally ☐ often

> I look at small objects/fine print at an intermediate distance.
Examples: computer, reading legal documents, bookkeeping, parts assembly.

☐ infrequently ☐ occasionally ☐ often

> I look at medium-sized objects/print at an intermediate distance.
Examples: DIY, carpentry, cooking, sorting/classifying objects, screen monitoring.

☐ infrequently ☐ occasionally ☐ often

> I look at objects from a distance.
Examples: driving a vehicle, flying, outdoor activities, TV/movies.

☐ infrequently ☐ occasionally ☐ often

Does your work or your daily activities require you to drive often in the evening or at night? (2 hours or more)

☐ > Yes ☐ > No

If you could have good distance vision without glasses during the day and good near vision without glasses, would you be prepared to tolerate perceiving halos around lights at night?

☐ > Yes ☐ > No

Chapter 5

CHOOSE THE LENS TO FIT YOUR LIFESTYLE

The intraocular lenses used to IRIS Ophthalmology Clinic:

> **foldable** materials (silicone or acrylic) allowing sutureless micro-incisions;

> an integrated **UV filter** making it possible to limit the detrimental effect of certain light rays on the retina, particularly the macula;

> an improved lens edge design allows reducing bothersome glare (dysphotopsia) and inhibits posterior capsule opacification after the surgery, commonly referred to as "after-cataracts";

> in most cases, an optical profile obtained with wavefront technology makes it possible to correct natural aberrations of the eye and the impaired sensitivity to contrasts related to aging.

The options: seeing far, seeing near or both

The ophthalmologist has a wide range of intraocular lenses to meet each person's specific needs. No type of lens is right for everyone. **Your surgeon will determine the one best suited to you**.

The professionals at the IRIS Ophthalmology Clinic carefully select from a range of safe and effective advanced technologies those best designed to meet your needs. They include the following intraocular lenses:

> Monofocal;

> Monofocal toric, compensation for astigmatism;

> Multifocal, compensation for presbyopia;

> Multifocal toric, compensation for astigmatism and presbyopia.

5.1 MONOFOCAL LENSES

The monofocal lens provides a single focus point, that is, it allows the eye to **see well at a single distance**.

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;

> monovision: one eye corrected for distance vision and the other for near vision.

5.1.1 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 (e.g., reading books, working at a computer, cooking, reading the time on your watch, putting on make-up, shaving, performing do-it-yourself work, etc.). Progressive lenses may be necessary, even if you don't need to wear them in order to see at a distance.

5.1.2 MONOVISION: ONE EYE CORRECTED FOR DISTANCE VISION AND THE OTHER FOR NEAR VISION

You can choose to have one eye (dominant) corrected for distance vision and the other (non-dominant) for near vision. This method provides an option that can reduce your dependence to corrective lenses.

Monovision may be simulated by contact lenses before surgery. It is not suited 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 stereoscopic vision (3D vision) leading to a loss of depth perception;

> 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 at a computer, reading small print, etc.).

5.2 MULTIFOCAL LENSES

Multifocal lenses corrects defects in distance vision: myopia, hyperopia and, in some cases, astigmatism (multifocal toric lens). They can also compensate for presbyopia by enabling simultaneous near vision, at a predetermined distance.

The multifocal intraocular lens provides more than one focal point, allowing the operated eye to see well **at more than one distance** by using the concept of simultaneous vision.

When the retina captures the different focal points, it selects the one corresponding to the object being viewed. This image selection process is not natural for the eye and requires a **period of "neuronal adaptation"**, which may vary from person to person. 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 on both eyes. This neuronal adaptation is comparable to the capacity to adapt to progressive lenses. Some people adapt easily within a few days, while others take more time or, in rare cases, never manage to do so.

The multifocal intraocular lenses recommended by the IRIS Ophthalmology Clinic utilize two different optical principles:

> Diffractive multifocal intraocular lenses (symmetrical);

> Zonal refractive multifocal intraocular lenses (aspheric).

The professionals at the IRIS Ophthalmology Clinic will advise you on the type of lens that is most appropriate for your eyes and vision to better meet your needs and lifestyle.

5.2.1 DIFFRACTIVE MULTIFOCAL LENSES

Diffractive multifocal intraocular lenses are designed with a **series of concentric rings**, finely etched on the surface of the lens. The rings start at the centre and progress towards the edge, in a symmetrical fashion. When light passes through these **diffraction** rings, it is divided into two focal points, the main one intended for distance vision, and the other for nearer distances.

The retina selects the focal point that corresponds to the image observed and ignores the out-of-focus image. This process becomes easier over time by **neuronal adaptation**.

Light diffraction into two or more focal points is associated with certain side effects, namely:

> Dispersion of light (up to 15%–20%), which may cause a **reduction in sensitivity to contrast in low-light conditions or in darkness**.

> **Perception of halos (ring or circle) around lights in dark conditions**, which may be classified as moderate to severe, based on the lens selected.

Most people who undergo surgery are very satisfied with the benefits diffractive multifocal lenses provide, namely very good near vision and greater freedom from glasses for most daily activities. With the exception of specific conditions, **the advantages of the lens should surpass any shortcomings**, such as the perception of halos around lights, particularly after an adequate period of adjustment.

Diffractive multifocal lenses are available in different add powers, each one having a specific theoretical reading distance. The professionals at the IRIS Ophthalmology Clinic will guide you in selecting add powers best suited to your activities and lifestyle:

> **+4.00 add power multifocal lens (*TECNIS® Multifocal*):** Corresponds to a depth of field of approximately +3.00 with glasses and enables you to see small objects up close, at an **average distance of 33 cm.** This lens may be suitable for you if you regularly perform tasks requiring fine motor skills up close (e.g., knitting, sewing). However, vision will not be as clear if the objects are moved back to an intermediate distance (at arm's length). Task-specific glasses may be necessary for certain tasks, if it is impossible for you get closer to your workspace (e.g., computer).

> **+3.25 add power multifocal lens (*TECNIS® Multifocal*):** Corresponds to a depth of field of approximately +2.25 with glasses and enables you to see small objects at an **average distance of 42 cm**. This lens may be suitable for you if you regularly perform tasks requiring fine motor skills or perform tasks over long periods of time at an intermediate distance (e.g., working at a computer, reading, accounting). However, the quality of your vision is decreased when objects are further away than the theoretical reading distance (e.g., reading the price on grocery store shelves, doing arts and crafts). In some cases, it may be necessary to move closer to the object.

> **+2.75 add power multifocal lens (*TECNIS® Multifocal*):** Corresponds to a depth of field of approximately +1.75 with glasses and enables you to see objects at an **average distance de 50 cm**. This lens may be suitable for you if you regularly perform tasks requiring moderate fine motor skills, at an intermediate distance or at arm's length (e.g., woodworking, painting, office work, looking at a screen).

- **Extended depth of field diffractive multifocal lens (*TECNIS® Symfony*)**: Uses the modified diffraction principle, extending the focal point, rather than splitting the light into two separate focal points. The depth of field obtained can be compared to a progressive depth of field of +1.50 add power with glasses. It enables you to see **far away, up to an average intermediate distance of approximately 60 cm**. This lens may be suitable for you if you wish to be free of corrective lenses for farsightedness, while preserving your freedom when performing daily activities at an intermediate distance (e.g., cooking, shopping for groceries). The lens provides functional vision up close, but may not be perfect for fine print at short distances. You may require task-specific glasses to read for longer periods. The lens is associated with the perception of halos around lights, which may be classified as mild to moderate. The light phenomena associated with this type of lens are expected to be less pronounced than with simultaneous vision diffractive multifocal lenses.

The **theoretical reading distance is provided for information purposes only** and may differ from one person to the next, depending on the shape of their eyes and how they recover.

Multifocal intraocular lenses enable good vision up close, but the quality may vary depending on lighting conditions. If necessary, **a task lamp is recommended for reading**.

+4.00 TECNIS® Multifocal and ***TECNIS® Symfony*** diffractive multifocal lenses are available as **toric lenses to compensate for astigmatism**. A special order is required and a delay in delivery is to be expected.

5.2.2 ZONAL REFRACTIVE MULTIFOCAL LENSES

The zonal multifocal intraocular lens is divided into **two zones of different add powers**, one of which focuses mainly on distant objects and the other on objects at a closer range. Both zones are separated by a transition zone that is relatively pronounced. The goad with zonal multifocal intraocular lenses is to decrease reliance on glasses for near and distant vision, by providing the operated eye **with an extended depth of field**.

Contrary to "bifocal glasses," there is no need to look down or in a specific direction to take advantage of the near vision provided by the zonal multifocal intraocular lens. When the eye focuses on an object up close, the retina selects the light rays passing through the closest zone of vision, regardless of the direction of the gaze (e.g., directly ahead, above or below). The diameter of the pupil and/or position of the lens behind the iris may influence the amount of light that passes through each zone of the multifocal lens. It is therefore **advisable to control ambient light** to benefit from the best possible quality of vision.

Refraction of the light through two zones of different powers may come with certain side effects:

> A slight dispersion of the light (up to 5%–10%) may cause a moderate reduction in sensitivity to contrast in low-light conditions or darkness.

> An effect of halos around lights in darkness (e.g., stretching, double vision), which may be classified as moderate to severe depending on the lens selected.

The light phenomena associated with this type of lens are expected to be less pronounced than with diffractive multifocal lenses.

Zonal refractive multifocal lenses are available in a variety of add powers, each one having a specific theoretical reading distance.

The professionals at the IRIS Ophthalmology Clinic will guide you in selecting the lens that is best suited to your eyes and vision and your lifestyle:

> **+1.50 add power zonal multifocal lens (*LENTIS® Comfort*):** The nearest optical zone corresponds to an add power of approximately +1.00 with glasses. The goal with this lens is to provide freedom from distance vision glasses and allow for functional vision at intermediate distances, up to **approximately 60–80 cm** for mid-size objects.

  This lens may be suitable for you if you primarily want good distance vision and can compromise a little on your vision in the dark, while maintaining freedom with daily tasks at an intermediate distance (e.g., seeing the dashboard in a car, cooking, biking, golfing). Vision may not be perfect for fine print at distances. Task-specific glasses may be required for tasks involving fine motor skills or tasks over long periods of time, mainly up close (e.g., reading, accounting, sewing). If you wish to optimize your freedom from glasses for near vision, the ophthalmologist may recommend a "micro-monovision" type of correction (Comfort Blended Vision). In such cases, the dominant eye is corrected to mainly improve intermediate and distance vision. Although slight myopia is the goal for the non-dominant eye to improve near and intermediate vision. You will need to adjust to a slight discrepancy in both eyes: the eye favouring near vision will not see as well at a distance, and vice versa. This type of correction offers good eyesight, but may not be perfect under all circumstances. Task-specific glasses may be required to balance out the eyes during tasks involving fine motor skills or over longer periods.

> **+3.00 add power zonal multifocal lens (*LENTIS® MPlus*):** The nearest optical zone corresponds to an add power of approximately +2.00 with glasses. The goal is to provide freedom from distance vision glasses and gain functional vision at near distances of approximately 40–50 cm.

  This lens may be suitable for you if have a strong desire to do away with your corrective lenses for distance vision, while maintaining freedom with tasks up close (e.g., reading a menu, using an electronic tablet, solving crossword puzzles).

> **+3.00 add power zonal multifocal lens, dominant for near vision (*LENTIS® MPlus X*):** The nearest optical zone corresponds to an add power of approximately +2.00 with glasses and has a more dominant zone in the central section of the lens, compared to the zone for distance vision. It is mainly intended for freedom from glasses for near vision at approximately 40–50 cm and provides functional distance vision.

  This lens may be suitable for you if you have a strong desire to do away with your corrective lenses during tasks involving fine motor skills or over longer periods (e.g., working at a computer, reading, accounting), while maintaining freedom without glasses for distance vision.

  The quality of the image may not be as good at a distance and certain light phenomena, such as stretching around lights in darkness, may be more pronounced with this type of lens compared to more moderate add power multifocal intraocular lenses, or with distant dominant zones.

The **theoretical reading distance is provided for information purposes only** and may differ from one person to the next, depending on the shape of their eyes and how they recover.

The ***LENTIS® Comfort, MPlus*** and ***MPlus X*** zonal refractive lenses are available as **toric lenses to compensate for astigmatism**. A special order is required and a delay in delivery is to be expected.

5.2.3 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 task-specific glasses will be needed **occasionally** for certain precise tasks, under certain conditions.

5.2.4 COMPROMISES: *WHAT YOU GIVE UP TO GAIN*

Multifocal lenses come with certain visual effects to which you will need 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., in fog);

> 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, thanks to the phenomenon of neuronal adaptation, the annoyance caused by these side effects tends to diminish over time (You will get used to it!).

Corrective lenses can improve the quality of vision when a residual defect is present (myopia, hyperopia or astigmatism).

5.3 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 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 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 (turned eye);

> you are unsuitable for a touch-up by laser surgery (LASIK or PRK) or the implantation of a second lens is not a possibility;

> you have already undergone vision correction by laser or radial keratotomy;

> you show a very high degree of astigmatism.

5.4 THE *"MIX-AND-MATCH"* SOLUTION

Like most active people, your daily activities probably vary and are not limited to a single, repeated task, performed at the same distance. In order to provide you with a wider range of clear vision without glasses and minimize the compromises associated with each type of intraocular lens, the ophthalmologist may recommend using one type of lens in one eye and a different type in the other eye. This is commonly known as a ***"mix-and-match"*** solution.

The intraocular lenses offered at the IRIS Ophthalmology Clinic have been certified and approved by Health Canada. The "mix-and-match" principle, which combines two different types of intraocular lenses for each eye for the same patient, has not received specific approval by Health Canada. However, this technique has been widespread in Europe and North America for the past several years. It has been the subject of several studies published in specialized literature, and presented at various international research conferences on refractive surgery.

You can therefore have the "best of both worlds" by combining the different technologies available to you!

5.5 COMPENSATION FOR ASTIGMATISM

During your preoperative assessment, the professionals at the IRIS Ophthalmology Clinique will use eye imaging techniques to determine if you have a significant degree of astigmatism on the cornea (shaped like a "football").

In order to decrease your reliance on corrective lenses after the surgery, the ophthalmologist may recommend different alternatives to compensate for your astigmatism:

> **Corneal limbal relaxing incisions** conducted before, during or after the procedure to replace the crystalline lens. This consists of thin, arch-shaped incisions at the edge of the cornea, reducing the curve of the cornea at its most curved axis.

> A **toric intraocular lens**, which compensates for the "football" shape of the cornea. The correction of astigmatism using a toric intraocular lens offers more precision than the limbal relaxing incisions, particularly with corneal astigmatism greater than 0.75D. Monofocal intraocular lenses and some multifocal lenses are available to correct astigmatism. They may require a special order. In some cases, a delay in delivery is to be expected.

> **Laser corneal refractive surgery**, such as LASIK or a surface ablation (photorefractive keratectomy or PRK), conducted 3 to 6 months following crystalline lens replacement surgery. There may be applicable fees.

5.6 OPTIONS AT A GLANCE

The professionals at the IRIS Ophthalmology Clinic will advise you on the most suitable choice of intraocular lens based on your oculo-visual condition, needs and lifestyle. There is no perfect intraocular lens or one-size-fits-all solution. Each choice has advantages and compromises that you would need to adapt to.

			AREA 1 NEAR	AREA 2 INTERMEDIATE	AREA 3 INTERMEDIATE	AREA 4 DISTANCE	LIGHT EFFECTS
							
MONOFOCAL	Monovision possible (one eye corrected for distance and the other for near vision)				★	★★★★★	Insignificant
DIFFRACTIVE MULTI	TM +4.00*	33 CM	★★★★★	★★	★	★★★★	Halos around lights in darkness. Moderate reduction in sensitivity to contrasts.
	TM+3.25	42 CM	★★★½	★★★★½	★★	★★★★	
	TM+2.75	50 CM	★★★	★★★★★	★★★	★★★★	
	SYMFONY*	60 CM	★★	★★★	★★★★★	★★★★½	
SEGMENTED MULTI	COMFORT (MF15)*	60-80 CM	★	★★	★★★★★	★★★★½	Possible stretching of lights. Slight reduction in sensitivity to contrasts.
	MPLUS (MF30)*	50 CM	★★★	★★★★	★★	★★★★	
	MPLUS X	50 CM	★★½	★★★½	★★	★★★	

*Available in toric lens (astigmatism compensation).

The clear vision areas are provided for information purposes only and may differ from one person to the next, based on the shape of the eye and healing effect. The information assumes that vision is corrected for distance and that there is no abnormality of the oculo-visual system affecting potential vision of the eye, other than that related to the natural lens.

Chapter 6
SURGERY

In the days prior to surgery, you will not have to instill medication eye drops unless otherwise stated by the ophthalmologist. However, if you already use eye drops to treat another ocular condition, you should continue to use them before the procedure.

Unless you have a particular condition, you will not need to interrupt your regular medications before surgery.

Reminder: The ophthalmologist must be provided with the full list of your medications and allergies.

To optimize the outcomes, **you should stop wearing your contact lenses completely before the surgery:**

> at least 48 hours.

Your ophthalmologist could ask you not to wear your contact lenses for a longer period of time, if deemed necessary.

6.1 DAY BEFORE SURGERY

It is recommended that you shower or bathe the day before or the morning of your surgery. Make sure to wash your hair and face as this will be harder to do in the first 24 hours after surgery.

It is important to remove the make-up the day before the procedure.

Arrange to have someone take you home after the procedure as you will not be able to drive.

At your pre-operative visit, you will be given a prescription for medicated eye drops to fill before the surgery. These drops must be instilled immediately after the surgery. You do not have to start them before the surgery.

N. B. Please advise us at least 24 hours in advance if you must cancel your surgery.

6.2 DAY OF SURGERY

Although the procedure lasts a short while, **plan on being at the clinic for about 90 minutes**.

Wear clean, comfortable clothing that can be unbuttoned easily. Avoid clothes that tighten arms and neck. Avoid fabrics that relieve fibers, such as wool or cotton fleece. Avoid jewelery.

Do not apply **any make-up, powder foundation, cream or lotion on your face**.

You can eat, drink and take your usual medications the day of your surgery.

Avoid drink that can increase eye dryness (alcohol, caffeine).

You will be provided with a hospital gown, cap and booties to cover your clothes, hair and shoes before entering the operating room. **You will not need to undress for the procedure**.

You will need to arrange to have someone take you home as you will be in no condition to drive.

6.2.1 CONSENT FORM

Before surgery, you will be asked to carefully read and sign a consent form. It is important to address all the questions or concerns that you may have after reading the consent form in order to discuss them with the ophthalmologist **before the procedure**.

6.2.2 METHODS OF PAYMENT

Surgery fees are paid **prior to the procedure**.

You will be issued a receipt in duplicate for income tax purposes. You will be able to claim these as medical expenses for a tax deduction.

Most methods of payment are accepted:

> cash;

> direct payment (make sure that the surgery fees do not exceed the daily safety limit imposed by your financial institution);

> credit cards (MasterCard, Visa, American Express);

> certified cheque;

> financing plan*.

N. B. Personal cheques are not accepted.

The surgery costs do not cover the cost of the medicated eye drops that must be instilled immediately after the surgery.

6.3 PREPARING FOR SURGERY

Under the supervision of a nurse, you will be led to a comfortable room where you will be prepared for surgery.

Different eye drops will be instilled in the eye to be operated on:

> anti-inflammatory and antibiotic eye drops;

> mydriatic eye drops to dilate your pupil.

The dilation eye drops take effect after 15 to 30 minutes and their action can last for several hours after the surgery.

Medication to control anxiety will be given to you, as needed.

The nurse will measure your blood pressure and your heart rate.

When your pupil will be sufficiently dilated, the nurse will lead you into the operating room.

During the procedure, you will be lying down on a surgical chair and your head will be stabilized in order to limit your movements.

A pulse oximeter will be used to monitor your heart rate and the level of oxygen in your bloodstream.

The ophthalmologist will apply an aesthetic gel to the eye to be operated on. Consequently, you should feel no pain during the procedure.

You will be asked to look straight ahead in the direction of the microscope's light. This light might appear very intense at first, but your eye will adapt to the glare.

A large sterile drape will cover your face and body. It will be attached around the eye to be operated on with the use of a very strong adhesive.

If you suffer from claustrophobia, mention it to the nurse and ophthalmologist. They will do all that is possible to ensure your comfort. The fact that you will be seeing light at all times during the procedure should help you relax.

It is important not to move during the procedure and to speak as little as possible. However, you must not hesitate to inform the surgeon or the nurse if you feel unwell, feel the urge to cough or need to move for any reason.

During the procedure, you will hear the ophthalmologist give instructions to the nurses and provide you with updates on how things are going. You will also hear the **typical hum** of the ultrasound machine used to fractionate the crystalline lens.

* The IRIS Ophthalmology Clinic offers an attractive financing plan in the form of equal monthly payments with no interest charges or fees. Ask our customer service for the conditions that apply.

6.4 SEQUENTIAL BILATERAL EYE SURGERY

The surgery usually lasts **less than 30 minutes** per eye.

The ophthalmologist operates on one eye at a time, and will decide how long to wait before operating safely on the second eye based on your pre-operative assessment.

The ophthalmologist may suggest performing **bilateral surgery in both eyes in sequence, on the same day**, to promote visual adaptation and avoid the inconvenience of multiple trips to the clinic.

As a rule, the eyes are operated on at approximetely 30 minutes interval. This gives the nurses time to reorganize the operating room, replenish all of the instruments, supplies and substances. This procedure is comparable to operating on the second eye on another day.

Of course, we will proceed to the surgery of the second eye if there are no unplanne events during the surgery of the first eye.

Sequential bilateral surgery is not recommended for all patients because strict criteria must be observed and the results must be foreseeable. You may not be a suitable candidate if:

> You have a condition that makes it more difficult to calculate intraocular lens power (e.g., previous corneal refractive laser surgery);

> You have a condition that increases the risk of complications (e.g., history of eye trauma);

> You are uncooperative during the surgery (e.g., difficulty staying in one position for several minutes, significant anxiety).

In most cases, a wait of 24 hours to one week is scheduled between the surgeries on both eyes, when bilateral surgery is not recommended.

Chapter 7

PHACOREFRACTIVE SURGERY: STEP BY STEP

The technique used for most phacorefractive surgeries nowadays is **phacoemulsification** (derived from the Greek *phakos*, meaning *lens*, and the Latin *emulsificar*, meaning to *transform into milk*).

During the procedure, a **tiny incision** will be performed along the edge of the cornea. This will allow the introduction of a microscopic probe in the eye. The probe break down the crystalline lens into minute particles. These are then aspirated out the eye by means of a vacuum system.

The natural crystalline lens thus removed is then replaced with a **foldable intraocular lens**.

Generally, this method necessitates no stitches.

N. B. The steps of the procedure can vary from one surgeon to the next or be changed depending on the eye to be operated on.

7.1 DISINFECTION AND CLEANING

The eyelids and the eye are cleaned and disinfected with an antiseptic solution.

Before the surgical procedure can begin, an **eyelid retractor** will be installed. It will serve to hold your eye open during the surgery.

The eye will be irrigated frequently to prevent excessive dehydration during the surgery.

7.2 ANAESTHESIA

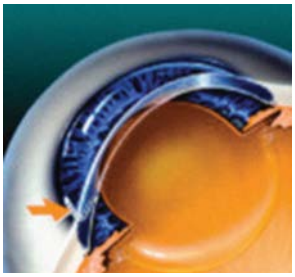
Normally, no injection (needle) is necessary as the eye is **anaesthetized with a gel**. The ophthalmologist could, however, decide to resort to an injection if deeper anaesthesia is needed or if your eye must be completely immobilized to facilitate surgery.

7.3 LIMBIC RELAXING INCISION

If you have astigmatism, the surgeon will make one or two arched incisions along the edge of the cornea in order to correct the problem in part or fully.

N. B. **Toric intraocular lenses** are available. They are recommended for the correction of **high astigmatism.**

7.4 PHACOEMULSIFICATION INCISION



A tiny incision about 3 mm long will be performed along the edge of the cornea, generally on the temporal side (side close to the ear). This incision serves as the entryway for the phacoemulsification probe and the foldable lens.

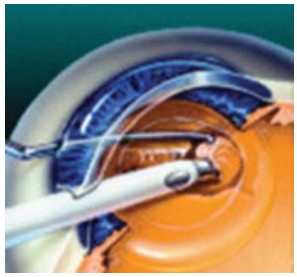
This **micro-incision** requires no stitches. It will **seal itself** after the procedure.

7.5 CAPSULORHEXIS

In capsulorhexis, the ophthalmologist cuts a circular opening in the anterior part of the capsule (envelope) to expose the lens inside. This delicate step requires a cooperative patient! You will need to **avoid excessive movement**.

An intact capsule will allow seating the intraocular lens properly inside the capsular bag.

7.6 PHACOEMULSIFICATION

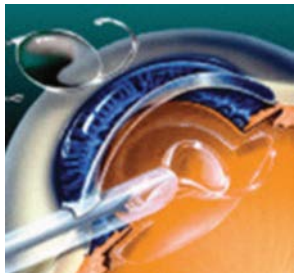


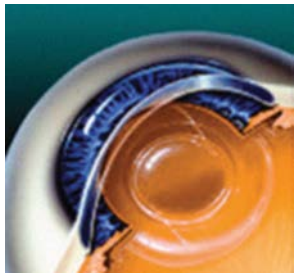
The phacoemulsification device has a microscopic probe that is inserted into the incision. The probe breaks up the lens into particles. These are then irrigated and suctioned from the eye.

Fragmentation of the crystalline lens may take more time or require more energy in the presence of the hardened nucleus of a dense, mature cataract.

It is normal to experience a **temporary loss of sight**. Do not be alarmed, your vision will return immediately once the artificial lens is implanted.

7.7 IMPLANTATION OF THE FOLDABLE INTRAOCULAR LENS





The surgeon will proceed to implant the intraocular lens by folding it in two and inserting it through the incision. Once the lens is in the capsular bag, it unfolds and settles into its position inside the eye.

The incision will close by itself like a flapper valve. In rare cases, the ophthalmologist may add a stitch, if necessary.

7.8 ADVANCED IMAGING AND LASER-ASSISTED SURGERY

The IRIS Ophthalmology Clinic offers latest generation technologies to provide you with a unique and personalized experience during every step of your phacorefractive surgery.

During the procedure, the ophthalmologist will use a system of advanced imaging techniques to guide him or her through some of the steps, in order to optimize the precision of the surgical result and ultimately promote your freedom from glasses. These technologies include the following:

> The **VERION™** system captures a unique digital image of your eye prior to the surgery and feeds a continuous image through the surgical microscope during the procedure. The system guides the ophthalmologist during certain major steps of the manual surgery: the location and shape of the incisions, the diameter and location of the anterior capsulorhexis and finally, the alignment of the intraocular lens compared to the visual axis.

- The **CATALYS®** precision laser system allows for the automation of certain steps traditionally performed by the surgeon using manual instruments (forceps, scalpel). The ophthalmologist develops a treatment plan, designed specifically for your eye condition, including one or several of the following steps:
  - Corneal incisions: When deemed necessary and safe by the ophthalmologist, a laser is used to create the primary cut and the limbal relaxing incisions, with the length and depth controlled to nearest micron;
  - Anterior capsulotomy: The quality of the opening of the anterior capsule of the crystalline lens is essential to the proper positioning of the intraocular lens within the capsular bag and ultimately, the precision of visual correction. The laser ensures a perfectly round opening, of a predetermined diameter, centered on the capsular bag. This promotes a uniform cover of the anterior facet of the intraocular lens and a more predictable positioning compared to a capsulorhexis performed manually.
  - Fragmentation of the crystalline lens: When deemed necessary and safe by the ophthalmologist, a laser breaks up the crystalline lens into smaller pieces, prior to the actual phacoemulsification. This decreases the amount of time required for the use of ultrasound waves before removing the crystalline lens, namely in the presence of a mature cataract.

These steps are performed in a few seconds with the precision and repeatability of the femtosecond laser. This is done via a three-dimensional imaging system, which allows for the location of the surface of the eye during the surgery (*OCT live*), identification of safety parameters and continuous guidance of the laser treatment during the procedure. Some conditions may limit or prevent the use of the **CATALYS®** precision laser system, including but not limited to:

> A significant opacity of the cornea;

> An inadequate dilation of the pupil;

> A physical condition that limits the comfort or quality of positioning the eye under the laser.

Talk to your ophthalmologist to determine if you are a good candidate for the surgery assisted by the **CATALYS®** laser.

There are applicable fees (Plan Ultra).

POST-OPERATIVE PERIOD

Chapter 8
AFTER SURGERY

Once the surgery is completed, you will be taken to a recovery room to rest. Unless you have a particular condition, there will be **no bandage or eyecup covering the eye operated on**. Although your vision will be blurred in the first few hours following surgery, you will be able to use the eye operated on immediately after the procedure.

You will be given a kit containing eyecups for sleeping, and a pair of sunglasses to reduce glare in the first few hours after the surgery. You will need to instill medicated drops after the surgery. The nurse will explain everything you need to do and will provide you with a checklist of reminder.

You will be able to leave the clinic as soon as you feel comfortable doing so. **You will need to arrange to have someone take you home** as you will be in no condition to drive.

N. B. In case of emergency, an on call ophthalmologist will be reachable.

Your first post-operative appointment will be made. You will then need to make time for **follow-up visits** at 24 hours, 1 week and 1 month after the surgery. In some cases, a check-up will also be slated at a 3-month interval. **The first visits must be done at the IRIS Ophthalmology Clinic**, while the following ones will be to a designated optometrist close to your home.

8.1 POST-OPERATIVE RECOMMENDATIONS

Do not plan any important activity after the surgery. You will need to **rest** for a few hours.

Avoid rubbing your eye and closing your eyelids firmly during the first two weeks.

The first night following surgery you must wear a **protective eye cup** over the operated eye while sleeping.

During the first 2 weeks, **avoid lifting anything heavier than 15 pounds** to prevent any accident.

There is no risk in bending down after the procedure.

Use appropriate safety goggles if you perform an activity that exposes your eyes to possible injury.

Remember that more accidents happen at home than at work (e.g., sports, biking, gardening, hiking, home repair, etc.).

There is no risk in exposing yourself to the sun after the procedure. However, you will be more sensitive to light during the 4 first weeks. You should wear sunglasses with an adequate UV filter when outdoors.

8.1.1 EYE DROPS

After surgery, you will have to instill different types of medication in the operated eye(s) such as, **antibiotic** and **anti-inflammatory** drops.

The dosage and duration of the treatment will be tailored to your condition by the ophthalmologist and/or the optometrist at the post-operative follow-ups.

Artificial tears can also be used if dryness occurs. If needed, you will be able to purchase these artificial tears from your eyecare professional or over the counter at any pharmacy, i.e. without a prescription.

If you use medicated eye drops to treat another ocular condition (e.g., glaucoma), you should continue to do so as directed by your doctor, **along with the medicated eye drops** prescribed for the surgery.

N. B. With the use of anti-inflammatory eye drops, you might notice an unpleasant **metallic taste** in the back of your throat. This occurs when the medication passes through the tear ducts, to the nose and then down the throat. To avoid this unpleasant taste, keep your eyes shut for 20 seconds after instilling the eye drops and apply a light pressure with your finger to the corner of the eye near the nose.

8.1.2 BATHING/SHOWERING

You can take a shower or bath already the day after the surgery. Keep your eyes closed in the shower and avoid having the water flow directly on your eyes during the first week. Also avoid getting water or shampoo in your eyes during the first few days. Wash your hair by letting the soap and water flow off the back of your head.

During the first week, you will be able to wash your face but you will need to **avoid splashing too much water into your eye**. Use a clean soft towel to pat yourself dry.

Clean any debris stuck to your eyelashes with a clean washcloth dipped in warm/hot water.

Men can shave on the next day.

8.1.3 MAKE-UP

Creams and lotions for the face can be applied already on the day after the surgery.

However, it is important to avoid the contour of the eye and the eyelids during the first week. **Mascara and eye-liner, therefore, are contraindicated during this period**.

Use new water-soluble products to avoid infection and to make make-up removal easier. This must be performed without exerting too much pressure on the eyes. Use gentle movements.

8.1.4 WORK

You will be able to return to work already the day after surgery or as soon as your vision seems good enough for you to perform your usual tasks. Indeed, there is no danger in using your eyes to read, watch television or to work at a computer.

However, if you work in a environment that is dusty and/or that poses a risk of infection or injury for your eyes, it would be preferable to wait 1 to 2 weeks after surgery before resuming your activities. If necessary, the clinic could provide you with a letter to justify your absence.

Always wear appropriate safety goggles for any risky activity.

8.1.5 DRIVING

During your post-operative visits, the ophthalmologist or the optometrist will tell you when you have reached a visual acuity in accordance with the requirements of the Ministry of Transportation to drive a vehicle for recreational purposes.

Avoid driving at night or in an unfamiliar environment as long as both your eyes have not been operated on. Your depth perception and the quality of your vision could be reduced temporarily.

Depending on the type of intraocular lens implanted, you might perceive halos or stretching around lights at night, primarily during the first month. Depending on lighting conditions, your sensitivity to contrasts might also be diminished slightly.

If the situation applies to you, you can then make a request to the Ministry of Transportation to eliminate the restrictions "Corrective lens" on your driver's license, You should wait for your eyesight to stabilize before making such a request (ideally 1 month after surgery).

8.1.6 SPORTS/LEISURE

Most activities of moderate intensity can already be resumed the day after surgery (e.g., walking, shopping, shows, etc.). It is recommended waiting 2 weeks for sexual relations.

However, it is recommended waiting a month for more intense activities or for those that require lifting weights in excess of 15 pounds (e.g., jogging, bowling, racquet sports, construction, etc.).

You must avoid swimming pools, whirlpool baths, steam baths and saunas during the first week. Swimming can be resumed after one week provided you wear swimming goggles. Avoid diving during the first weeks.

8.1.7 DIET

With the exception of any previously imposed by your doctor, there are no post-surgery diet restrictions.

However, you should try to follow a diet rich in fibre and liquids to avoid constipation.

8.2 STABILIZATION OF VISION

As you wait for your vision to stabilize, your eyeglass correction might not be right for you anymore. Your comfort will grow once your second eye is operated on. In the meantime, you will have to either put up with your old correction or function without glasses with the eye operated on.

Your correction will need to be modified by your optometrist about 4 weeks after the procedure. In rare cases, the ophthalmologist and/or the optometrist could recommend waiting 8 to 12 weeks.

8.3 HAVING REALISTIC EXPECTATIONS

It is important to understand that, for various reasons, **the outcome of the surgery cannot be guaranteed**.

Your vision may not be perfect after the replacement of your natural crystalline lens. **It may not be possible to correct this deficiency with glasses** if, for example, you present any of the following anomalies:

> tear film deficiency;

> anomaly of the cornea;

> anomaly of the vitreous;

> anomaly of the macula, retina or optic nerve;

> amblyopia (lazy eye) or strabismus (turned eye).

N. B. When a cataract is present, the surgeon may not be able to observe the details of the structures located behind the crystalline lens. Consequently, a pre-existing anomaly may be discovered only once the cataract is removed.

It may happen that certain conditions can diminish the reliability of the pre-operative measurements and increase the likelihood of having to wear glasses after surgery:

> presence of high astigmatism;

> presence of a very mature cataract or of a posterior subcapsular cataract;

> an eyeball that is abnormally long (severe myopia) or abnormally short (high hyperopia);

> an irregular or diseased cornea;

> a cornea previously operated on to correct myopia, hyperopia or astigmatism;

> a disease of the retina.

It is not uncommon for glasses to be necessary after surgery to perform certain tasks under certain conditions even if you choose to correct your vision defect with the lens most appropriate for you.

Various vision correction options can be considered to enhance the outcome of the surgery. The solution chosen will depend on the residual refractive error to be corrected:

> occasional wearing of glasses and/or contact lenses;

> correction by laser photorefractive surgery, LASIK or PRK;

> addition of a second intraocular lens;

> correction by explanting and replacing the intraocular lens.

Fees for certain additional surgeries may apply.

In certain cases, vision can take several weeks, if not several months, to stabilize. Consequently, you will need to wait patiently the time that it takes before a second surgical procedure can be planned, **if deemed necessary and safe by the ophthalmologist**.

8.4 POSTERIOR CAPSULE OPACIFICATION OR "AFTER-CATARACTS"

For the purpose of supporting the intraocular lens, the crystalline lens capsule is preserved. Following a natural scarring process, the capsule at times loses its transparency. This phenomenon can arise even several years after surgery.

This capsule opacification comes with the following symptoms:

> progressive decline in quality of vision;

> increased perception of glare or sensitivity to light;

> increased perception of halos or stretching around lights at night.

A minor procedure called **YAG laser posterior capsulotomy** allows treating the opacity of the posterior capsule when it bothers vision significantly. The ophthalmologist will generally wait a minimum of 3 months after replacement of the crystalline lens before performing a capsulotomy. The risk of complications with this procedure is at a minimum level.

During the procedure, the YAG laser beam is focused on the capsule in order to "drill a hole" in the opacified zone. This opening allows light rays to reach the retina freely, thus eliminating the fog effect.

> This procedure takes approximately 5 to 10 minutes per eye.

> It is performed in a examination room and necessitates **no incision** on or in the eyeball;

> As the pupil must be dilated for this procedure, **you will need to arrange to have someone take you home** as you will be in no condition to drive;

> Generally, no medication is prescribed after the procedure.

Chapter 9

POST-OPERATIVE RECOVERY

Although eyesight recovery is encouraging in the days following surgery, **healing will take 3 months to complete**.

9.1 NORMAL SYMPTOMS

The symptoms below are common immediately after surgery. Most of these are tolerable and diminish in intensity over the following weeks. These symptoms should not be cause for concern, **unless they worsen over time**:

> cloudy vision;

> slight sensitivity to light/glare;

> sensation of foreign substance or grain of sand in the eye;

> sensation of dry eyes;

> tearing (watery eyes);

> moderate reddening of white of eye;

  – On occasion, red blood spot will appear on the white of the eye. It is the result of a blood vessel rupturing during the procedure. This condition is no more than a benign hematoma (bruise) and will re-absorb within a few weeks.

> burning when eye drops are applied;

> slightly sagging eyelid, eye appears smaller;

> pupil of a different size or shape compared with other eye;

> perception of spots swimming in the visual field (eye floaters);

> positive dysphotopsia (streaks or arcs of light, glare, impression that the intraocular lens vibrates when the eye moves);

> negative dysphotopsia (perception of shadows or lack of vision in the temporal peripheral visual field);

Most of these are tolerable and will diminish in intensity over the following weeks.

Certain symptoms can be associated with the type of intraocular lens implanted (e.g., multifocal or monofocal lenses using the monovision method):

> perception of halos around lights;

> slight reduction in sensitivity to contrasts.

It is not always possible to correct these symptoms through a correction in glasses and/or contact lenses. Fortunately, the **annoyance caused by these symptoms tends to diminish over time (3 to 6 months) thanks to the phenomenon of neuronal adaptation**. However, this adaptive capacity varies from person to person.

9.2 ALARMING SYMPTOMS

Immediately contact the clinic or surgeon on call if you experience:

> significant reddening of the eye;

> persistent pain;

> a marked deterioration in your vision;

> nausea or vomiting;

> bright flashes in the absence of ambient light;

> any significant change that is not an improvement.

9.3 POSSIBLE COMPLICATIONS

All surgical procedures carry a minimum level of risk of complications. Phacorefractive surgery is no exception to the rule.

By definition, a complication is an **unforeseeable event** that occurs during or after surgery and that **can lead to a temporary or permanent drop in the quality of vision**. This deterioration might not be correctable with glasses and/or contact lenses.

Phacorefractive surgery is one of the most frequently performed procedures in North America. In the United States alone, more than 1.5 million are practised each year. In **95%** of the cases, there are **no complications**.

The rate of complications varies as a function of the ocular and systemic health of the person undergoing surgery. The associated loss of visual quality depends on the gravity of the complication. In most cases, it is limited to a minor drop in visual acuity with no loss of functionality. Cases of blindness resulting from a major complication are extremely rare, but we cannot exclude this possibility.

The ophthalmologist will review with you all the risks and benefits associated with the surgery. However, it is not possible to list all the events that could occur during or after the procedure. **A thorough assessment of your oculo-visual condition and the analysis of medical history** will allow the ophthalmologist to identify the most probable risks you face and to estimate the potential improvement in vision you stand to gain with surgery.

9.3.1 MINOR COMPLICATIONS AND SIDE EFFECTS

Minor complications occur in about **5% of cases** and generally do not result in a permanent or significant drop in the quality of vision. Some of these symptoms may fade gradually with healing or under the effect of neuronal adaptation. In rare cases, they can become permanent.

The symptoms associated with these minor complications can generally be relieved through:

> the use of artificial tears;

> wearing glasses (e.g., tinted lenses, optical correction);

> a change in dosage of the medication eye drops;

> wearing contact lenses (therapeutics or bandages);

> undergoing a second procedure (e.g., laser surgery, capsulotomy, vitrectomy, stitch, etc.).

These complications or side effects include, **but are not limited to**, the following:

> loss of physiological accommodation;

> over/under-correction or residual astigmatism;

> dry eyes;

The problem of dry eyes is not unlike that of dry skin. **It is generally a chronic condition that requires the regular use of lubricants. It is a situation that lasts a lifetime!**

> dysphotopsia (perception of glare, halos, flashes or dark shadows);

> perception of eye floaters;

> posterior vitreous detachment;

> double vision or an imbalance in binocular vision;

> epithelial erosion;

> transient corneal oedema (swelling);

> transitory increase in intraocular pressure;

N. B. In some cases, surgery can reveal glaucoma that went undetected previously. This condition could require referral to a medical specialist in the public sector.

> incision leak;

> uveitis (inflammation of the anterior segment of the eye);

An inflammation "rebound" may be observed a few days or weeks after stopping the use of medicated eye drops. If so, it may be necessary to resume the use of these eye drops.

> transient macular oedema;

> rupture of the posterior capsule;

If the posterior capsule ruptures during the procedure, the surgeon may have to change the power and the type of the intraocular lens implant.

> vitreous leak;

> iris or pupil trauma;

> sagging of the eyelid.

9.3.2 MAJOR COMPLICATIONS

The likelihood of a major complication varies from 0.02% (2 cases out of 10,000) to 1% of cases. These complications are considered very serious and **must be managed swiftly and effectively in order to avoid or limit irreversible vision damage**.

This type of complication generally occurs on account of a predisposition owing to poor health or an irregularity of the structure of the eye

These complications include, **but are not limited to,** the following:

> endophtalmitis (infection of the intraocular structures);

> detachment of the retina;

> persistent macular oedema;

> pre-macular membrane;

> persistent corneal oedema;

> nucleus drop in the vitreous;

> luxation (dislocation) of the intraocular lens.

9.3.3 EXTREME OR SEVERE COMPLICATIONS

Extreme complications are extremely rare, occurring in about 0.01% of cases (1 case out of 10,000). Unfortunately, however, they are associated with a very high rate of ocular morbidity, which can result in a loss of vision if not complete blindness.

These complications include, **but are not limited to**, the following:

> expulsive haemorrhage;

> massive choroidal detachment;

> optic nerve trauma.

Certain conditions may necessitate emergency hospitalization or consultation and/or surgical procedure by another specialist.

Certain fees may apply.

MAKE AN INFORMED DECISION

Chapter 10

CHOOSE THE IRIS OPHTHALMOLOGY CLINIC

10.1 SHOULD YOU CONSIDER PHACOREFRACTIVE SURGERY?

The persons with the highest satisfaction rating following their surgery are generally:

> those who have **realistic expectations** about what their vision will be like after their natural crystalline lens is replaced with an artificial intraocular lens;

> those who **understand the potential risks and side effects** of such surgery.

This short questionnaire can help you to determine whether you are ready for phacorefractive surgery:

	Yes	No
> Do your glasses and/or contact lenses interfere with doing your work, playing sports or performing daily activities?		
> Do you understand and accept the risks of surgery?		
> Do you understand that the effects of the surgery will be permanent and irreversible?		
> Do you understand that the refractive surgery will require that you submit to check-ups at regular intervals? Will you have the time to go to these?		
> Do you understand that the results of the surgery cannot be 100% guaranteed?		
> Do you understand that you could have to **wear glasses** after the surgery to perform certain tasks under certain conditions?		
> Do you understand that you could need a second surgical procedure in order to enhance the outcome of the first, **if deemed necessary and safe by the ophthalmologist**?		

If you have answered "no" to any of these questions, we encourage you to discuss the surgery and your expectations further with your ophthalmologist.

10.2 YOUR SAFETY OUR TOP PRIORITY

The first mandate of the IRIS Ophthalmology Clinic is to **respect and exceed all safety surgical standards**.

We are providing to you the following:

> a team of qualified ophthalmologists, optometrists, opticians and nurses;

> a Central Supply Room operated by Certified Medical Device Reprocessing Technician, that applies the same rigorous sterilization techniques use in large hospitals;

> a Clinical staff fully trained in cardiopulmonary resuscitation (CPR);

> an operating room equipped with a positive-pressure, laminar airflow purification system to ensure a sterile surgical environment;

> surgical instruments coupled to an uninterruptible power supply (UPS) back-up in the event of a power outage;

> diagnostic and surgical instruments that make it possible to optimize the refractive outcome of the surgery;

> products that meet highest standards of effectiveness and safety;

> the latest-generation foldable intraocular lenses;

> all lenses used at the IRIS Ophthalmology Clinic are certified by national agencies (e.g., Health Canada and the U.S. Food and Drug Administration (FDA));

> a clinic accredited with the highest accreditation award "Accredited with Exemplary Standing".

> a quiet comfortable environment.

The IRIS Ophthalmology Clinic has been designated a practicum **centre for refractive surgery** by the Université de Montréal School of Optometry. This recognition is the fruit of efforts by all our professionals who regularly take part in the various continuing professional education activities offered by the CPRO (Centre de perfectionnement et de références en optométrie) and accredited by the Quebec Order of Optometrists.

NOTES

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