

I R I S

OPHTHALMOLOGY CLINIC



Information Guide

laser refractive surgery - ultralasek

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Over the past year, 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”

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 refractive laser surgery. 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 assist you in making 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 wearing your contact lenses completely 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.

The ophthalmologist may ask you to extend this downtime, if deemed necessary.

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 person to person 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**
- by visiting our website at **coi.iris.ca/en**

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

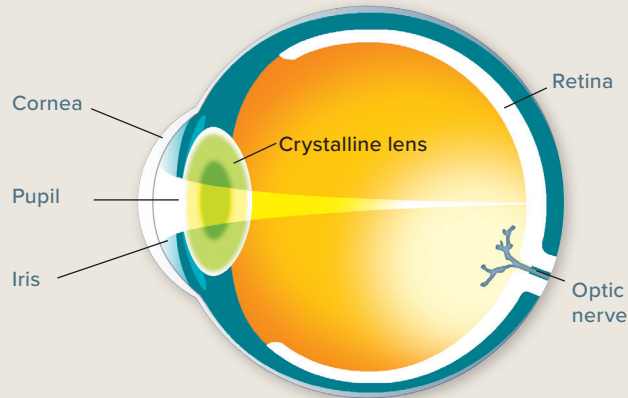
When these muscles contract, the crystalline lens bulges out in the shape of a magnifying glass. This action, referred to as **accommodation**, allows the eye to adjust its focus on objects located at different distances. It is like the zoom on a camera lens.

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**.

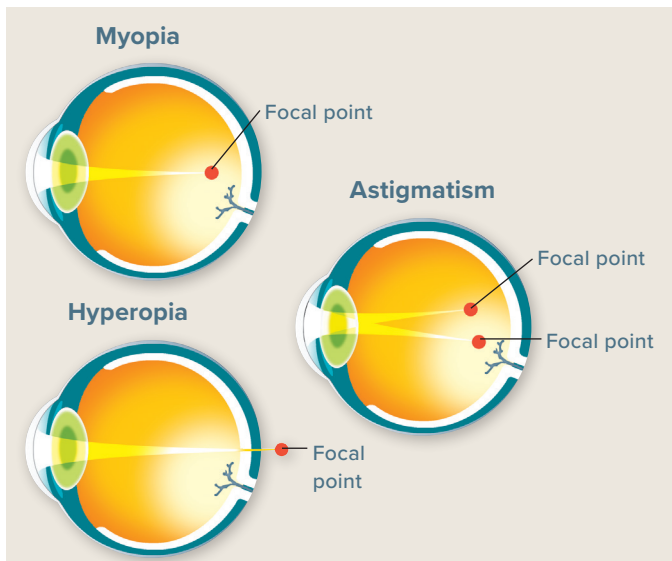
N. B. Any disease or anomaly of the eye can prevent someone from having perfect vision even after undergoing surgery performed under the best possible conditions.

Normal anatomy of the eye

Emmetropia: light rays focus directly on the retina



Visual defects



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 laser surgery, the ophthalmologist changes the curvature of the cornea, using the Excimer laser, 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 is too steep**, the rays of light converge in front of the retina. The result is **blurred vision primary at a distance**.

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

To correct myopia, **the laser must flatten the curvature of the cornea** by pulverizing the cell layers located mainly at its centre. The ophthalmologist selects the size of the treatment zone beforehand. Ideally, it must correspond to the size of the pupil in darkness. A treatment zone smaller than the diameter of the pupil can produce troublesome adverse effects such as the perception of halos around lights in the evening.

The number of pulverized layers at the top of the cornea is directly proportional to the degree of myopia to be corrected and the size of the treatment zone. If you have high myopia and large diameter pupils, chances are your cornea will not be thick enough to allow correction in an efficient and safe manner.

Laser surgery must be considered with great caution in case of myopia exceeding -10.00 dioptries.

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.

To correct hyperopia, **the laser makes a groove** around the pupil, at the periphery of the cornea, in order to make it more curved at the centre.

Hyperopia correction by laser surgery is **30% more difficult to execute than myopia correction**. Generally speaking, treatment of hyperopia by laser is limited to low degrees of +6.00 dioptres.

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.

In general, astigmatism can be corrected by laser surgery. The laser will proceed to a more or a less profound corneal ablation, according to the axis treated.

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 to 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 TELLTALE SIGNS

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 people 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.

2.3.2 PRESBYOPIA ALERT

If you're 40 or older, read on.

Corneal laser surgery does not accelerate age-related loss of lens flexibility. But, in return, it does not make it possible to slow down the progression of presbyopia after 40 years either.

The optometrist and the ophthalmologist can offer you different correction options:

- Two eyes corrected for distance vision;
- Monovision: one eye corrected for distance vision and the other for near vision.

2.3.3 CORRECTIONAL ALTERNATIVES

2.3.3.1 Two eyes corrected for distance vision

This alternative will allow you to benefit from the best quality of vision for your distant vision tasks. This is what nature should have given you from the start (e.g. driving the car, watching television, going to the movies, playing sports, etc.). However, if your vision is perfectly corrected for distance vision, you may have to resign yourself to wearing glasses to correct your vision at an intermediate and near distance (Ex.: reading a book, working on a computer, reading the time on the bracelet - watch, see the dashboard in the car, apply makeup, cook, tinker, etc.). Progressive focuses may be needed, although you don't need to wear them to see in the longer distances.

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

Monovision aims to correct one (dominant) eye for distance vision and to leave the other eye slightly short-sighted in order to provide it with more functional near vision. This method offers an alternative to 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:

- Each eye sees clearly only one distance (one eye for distance vision and the other for near vision). Vision may not be perfect in all circumstances;
- Reduction in stereoscopic vision (3D vision) leading to a loss of depth perception;
- A blurry vision in one eye can cause a perception of halos around lights at night.

Corrective lenses may therefore be necessary to equalize the vision of both eyes when performing precision tasks or to improve your comfort during prolonged tasks (e.g. driving the car at night, working on a computer, reading small print, etc.).

Chapter 3

Are you a good candidate?

Contrary to popular beliefs, not all patients are automatically good candidates for laser surgery. Before proceeding with the pre-operative exam, the ophthalmologist will have to ensure that you meet some basic conditions by asking you a few important questions.

Laser surgery may not be recommended if:

- You have a high degree of myopia (-12.00 dioptries or more) or a high degree of hyperopia (+6.00 dioptries or more);
- The thickness of your cornea is insufficient for the necessary correction.

3.1 ARE YOU AT LEAST 18 YEARS OLD?

The minimum age to be eligible for refractive laser surgery is 18 years old.

3.2 HAS YOUR VISION REMAINED STABLE AT LEAST FOR THE PAST YEAR?

If your eyewear prescription, for either glasses or contact lenses, has changed by more than 0.75 dioptre during the last year, you should wait for your eyes to stabilize before proceeding with surgery. Laser surgery does not put a stop to the natural evolution of your vision.

It is possible that your vision is unstable if:

- You are in your early twenties or younger;
- You are pregnant or nursing;
- You are suffering from hormone fluctuations caused by illness such as diabetes;
- You are taking medications that affect your vision, such as corticosteroids or anti-depressants.

3.3 ARE YOU PREGNANT OR NURSING?

Hormones produced during pregnancy or nursing can trigger instability in your vision or eye dryness. It is recommended that you wait for a period of approximately 3 months after pregnancy or the end of nursing before proceeding with surgery.

Also, please inform your ophthalmologist if you are planning a pregnancy within 6 months following your laser surgery.

3.4 ARE YOU DIABETIC?

Uncontrolled or unstable diabetes could cause a fluctuation in the quality of your vision which makes it difficult to achieve adequate correction. Moreover, this condition could affect your post-operative recovery by slowing down the natural healing process.

3.5 ARE YOU SUFFERING FROM AN ILLNESS OR ARE YOU TAKING MEDICATION THAT COULD AFFECT YOUR RECOVERY?

The healing of your cornea after laser surgery can be affected by some conditions such as autoimmune diseases (e.g., lupus, rheumatoid arthritis), immunosuppressive conditions (e.g., AIDS, therapies or medications preventing transplant rejection) and vascular diseases (e.g., diabetes). Delays in healing and recovery have also been observed in people taking certain medications (e.g., cortisone, retinoic acid).

Please notify your ophthalmologist if you have a history of excessive scarring following an injury or a surgery (keloids).

3.6 ARE YOU SUFFERING FROM OCULAR DISEASE?

Some forms of ocular (eye) diseases (either hereditary or acquired with age) can be considered as contraindications to laser surgery for various reasons because:

- They lead to a progressive deterioration of the quality of

the vision which cannot be corrected with eyewear (e.g., cataracts, keratoconus);

- They require the use of medication eye drops or, eventually, surgical intervention (e.g., glaucoma);
- They can reappear after surgery (e.g., infection of the cornea due to herpes simplex virus or herpes zoster virus);
- They could get worse after surgery (e.g., corneal dystrophy, dry eye syndrome).

In addition, it is important to inform your ophthalmologist if you have had an eye injury or an eye surgery in the past (e.g., PRK, radial keratotomy, LASIK, strabismus surgery).

3.7 DO YOU HAVE A “LAZY EYE”?

Amblyopic eye (lazy eye) causes weak eyesight, which cannot be totally corrected with eyeglasses or contact lenses. This particular ocular weakness is often present at birth or following a strabismus (an eye that wanders).

Laser surgery cannot give a “lazy eye” better vision than what can be achieved with corrective lenses. Furthermore, if a surgical complication were to arise in the “good eye”, overall vision could be irreversibly affected. Consequently, the ophthalmologist will have to study your case with great care prior to any intervention.

3.8 OTHER ALTERNATIVES WITHIN YOUR REACH

During the pre-operative assessment, if a contraindication to the laser surgery is identified, you will be introduced to other solutions to correct your vision:

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

This procedure can be considered for people aged between 45 and 50 years, when the eye's natural lens loses its ability to accommodate.

The ophthalmologist will recommend you the solution that best matches your needs and lifestyle.

Laser Surgery

Chapter 4

Surgery

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.

4.1 DAY BEFORE 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.

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

4.2 DAY OF SURGERY

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

Wear comfortable and clean clothes. Avoid clothes that tighten arms and neck. Avoid fabrics that relieve fibers, such as wool or cotton fleece.

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

Do not wear **any perfume** (their vapours can affect the efficiency of the laser beam).

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

4.2.1 CONSENT FORM

Before your surgery, you will be asked to carefully read and sign a consent form (see Appendix 1). 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.**

4.2.2 METHODS OF PAYMENT

Surgery fees must be 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 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.

4.3 PREPARING FOR SURGERY

The laser surgery usually lasts less **than 15 minutes per eye**.

Both eyes are normally operated on during the same session. However, if the surgeon deems that it would be preferable to wait for the healing of the first eye, the second eye will be operated on later.

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

Antibiotic and anti-inflammatory drops will be instilled in your eyes.

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

During the procedure, you will be lying down and your head will rest comfortably on a recessed cushion to limit head movements.

Do not tie your hair behind the nape of your neck to avoid being uncomfortable.

The ophthalmologist will inform you about the progress of the intervention during the procedure.

Chapter 5

Laser surgery: step by step

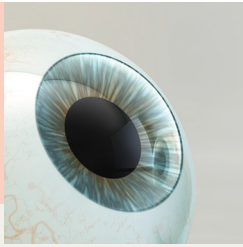
Laser surgery is designed to correct myopia, hyperopia and astigmatism.

- In **ULTRALASIK**, a fine strip of the cornea (lamella commonly called flap) is first created with the aid of Laser Femtosecond intralase IFS in order to expose the deepest layers.
- In surface ablation, the skin-like surface of the cornea (epithelium) is removed with an alcohol-based or a rotative brush.

This technique is most often used for people whose cornea may not be suited to create a corneal flap required for LASIK or when the activities (work/leisure) are at high risk of moving the flap created by ULTRALASIK.

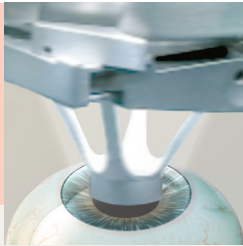
5.1 ULTRALASIK SURGERY: STEP BY STEP

Step 1



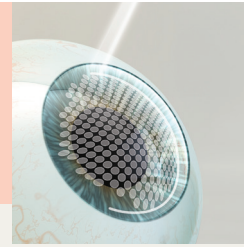
- The eye is **anaesthetized using drops**;
- An eyelid spreader is used to keep the eye open;

Step 2



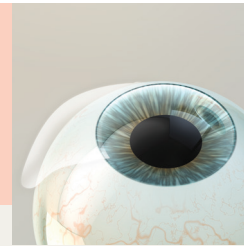
- The suction ring is placed on the eye;
- The suction is activated according to the ophthalmologist's directions;
- During the suctioning, the internal pressure of the eye increases significantly, resulting in **a temporary loss of your vision** (blackout). Don't worry, your vision will return immediately after the withdrawal of suction.

Step 3



- The ophthalmologist activates the laser femtosecond Intralase IFS which creates a small flap (lamella) on the surface of the cornea. This step last for 15 seconds;
- The duration of the cut with the *FemtoSecond Intralase IFS laser* is around 15 seconds;
- The suction is lessened as soon as the flap creation is completed.

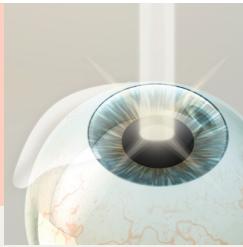
Step 4



- The ophthalmologist lifts up the flap.

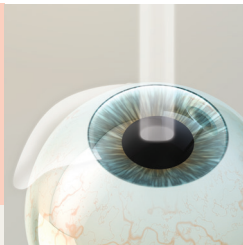
N. B. During this step, you will have the impression that the ring is tightening on your eye. Despite the use of anesthetic drops, you will feel a pressure inside the eye provoking a significant **discomfort** for approximately **15 seconds**.

Step 5



- The ophthalmologist asks you to stare at a **green flashing light**. The light will appear blurred and irregular like a cloud. Try to stare at any point in the centre of this cloud;
- Your eye is aligned and centred under the laser microscope and the position of your pupil is recorded by the **eye tracking system** (Eye Tracker);
- The Eye Tracker allows the laser to recognize your eye (iris recognition) and to follow the ocular micro-movements during surgery to maintain good alignment of the treatment;
- If your eye moves outside the tracker zone, the laser **stops automatically**. Once the ophthalmologist is able to achieve a good realignment, the laser is reactivated and picks up the treatment exactly where it left off.

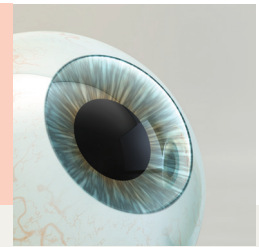
Step 6



- The Excimer laser, assisted by the software CRS-Master, vaporizes tissue layers and precisely sculpts the cornea in order to change the curvature according to the planned correction;
- The rapid pulsations of the laser make a **buzzing noise**;
- The pulverized cells at the surface of your eye form a sort of smoke releasing a **distinctive odour**;
- The laser correction takes less than 30 seconds, depending on the amount of correction.

N. B. You will experience **no pain** during the laser procedure.

Step 7

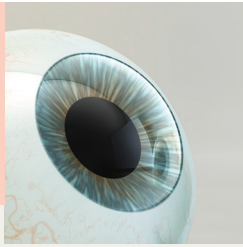


- The flap is repositioned to cover the treated zone;
- The ophthalmologist uses saline solution to irrigate tiny debris that can lodge under the flap. You might feel the liquid draining out of the side of your eye;
- The flap adheres naturally to the rest of the cornea in a few seconds. This link is strengthened during the recovery period up to 3 months;
- The eyelid spreader is gently removed.

N. B. A fine scar around the flap is visible under a microscope after the surgery. However, this scar cannot be perceived by the eye and will not affect its appearance.

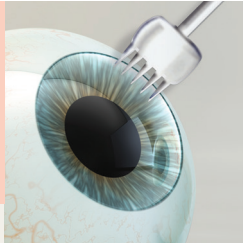
5.2 SURFACE ABLATION SURGERY: STEP BY STEP

Step 1



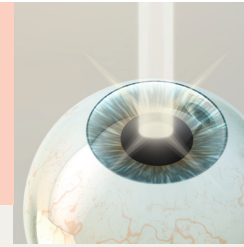
- The eye is **anaesthetized using drops**;
- An eyelid spreader is used to keep the eye open

Step 2



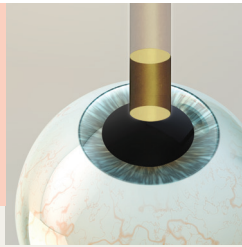
- The superficial layer of the cornea (epithelium) is removed to expose the underlying layers;
- According to the method recommended by the ophthalmologist, the epithelium can be removed with a dilute alcohol solution, a rotating or non-contact brush, by laser spraying (trans PRK).

Step 3



- The ophthalmologist asks you to stare at a **green flashing light**. The light will appear blurred and irregular like a cloud. Try to stare at any point in the center of this cloud;
- Your eye is aligned and centred under the laser microscope and the position of your pupil is recorded by the **eye tracking system** (EyeTracker);
- The Eye Tracker allows the laser to recognize your eye (iris recognition) and to follow the ocular micro-movements during surgery to maintain good alignment of the treatment;
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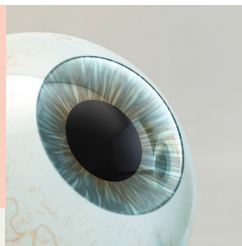
Step 4



- The Excimer laser, assisted by the software CRS- Master, vaporizes tissue layers and precisely sculpts the cornea in order to change the curvature according to the planned correction;
- The rapid pulsations of the laser make a **buzzing noise**;
- The pulverized cells at the surface of your eye form a sort of smoke releasing a **distinctive odour**;
- The laser correction takes less than **30 seconds**, depending on the amount of correction.

N. B. You will experience **no pain** during the laser procedure.

Step 5



In most cases, a solution of Mitomycin C will be applied for a few seconds on the treated area. Subsequently, the ophthalmologist will use saline solution to irrigate the treatment area. You might feel the liquid draining out of the side of your eye;

- A soft contact lens is inserted on the exposed cornea to protect the surface while the epithelium regenerates. This bandage contact lens will be removed 4-5 days after surgery;
- The eyelid spreader is gently removed.

Chapter 6

Schwind Amaris® 750S

The Schwind Amaris® 750S laser combines features that aim to optimize the efficiency, predictability and safety of laser surgery.

Among those :

- An ultra-smooth ablation surface, for optimal visual recovery, thanks to **Smart Pulse** technology;
- An ablation speed two to three times faster than a conventional laser, with a very short treatment time of **1.5 seconds** per diopter (myopia);
- A system for tracking eye movements in six (6) dimensions, allowing perfect dynamic alignment, throughout the duration of the treatment;
- An aspherical ablation profile to maximize the quality of night vision and contrast sensitivity;
- High-resolution diagnostic devices, allowing customized vision correction through personalized ablation, guided by topography or aberrometry.
- **SmartSurf^{ACE} technology** to offer **Trans PRK** surgery, a non-contact, no-cut, no incision surface ablation.

6.1 A CUSTOMIZED CORRECTION

The eye is not a perfect optical system. In addition to blurry images caused by myopia, hyperopia and astigmatism, the eye can show other subtle focus deficiencies, commonly referred to as **higher aberrations**. In general, conventional prescription glasses or contact lenses do not correct these conditions. The degree and shape of aberrations may differ from one person to another and also change with age.

Correction of the vision by traditional laser induces a modification of the natural curvature of the cornea. Studies have shown that, for some patients, this change in the curvature could amplify the optical aberrations of the eyes, thus explaining the onset of symptoms such as halos and reduced night vision after surgery.

Thanks to its ultra-fast and thin laser beam as well as its personalized ablation mode, the **Schwind Amaris® 750S laser** makes it possible to minimize the depth of the ablation and to respect the natural curvature of the cornea. This technology allows better control of post-operative optical aberrations, while ensuring a quality of vision higher than the standard ablation modes. This technology also allows to reduce the risk of side effects, such as perception of halos around lights at night.

In addition, the **Schwind Amaris® 750S** laser is connected to an “aberrometer” and a “topographer” which measure with high definition the pattern of aberrations of each patient. The information recorded by these devices can then be incorporated into laser programming for personalized correction in individuals with higher than average aberrations.

Post-Operative Period

Chapter 7

After surgery

Once the surgery is completed:

- **ULTRALASIK:** The ophthalmologist will examine your eyes before you leave the surgery room. You will then be taken to a recovery room. We will recommend that you keep your eyes closed during this period. You will be able to leave the clinic as soon as you feel comfortable doing so.
- **Surface ablation:** You will be taken to a recovery room. You will be able to leave the clinic as soon as you feel comfortable doing so.

You **will be given a surgery kit** containing prescription for medication eye drops, sample bottles of artificial tears, eye cups for sleeping, and a pair of sunglasses. The nurse will explain all that you will need to do and will provide you with a checklist to remind you.

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**:

- **ULTRALASIK:** 24 hours after surgery, 1 week, 1 month, 3 months and 1 year post-operative.
- **Surface ablation:** 24 hours after surgery, between 3 and 5 days, 1 week, 1 month, 3 months and 1 year post-operative

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.

- N. B.** Although surface ablation procedure is not painful, post-operative discomfort varies from one patient to another. Most patients experience moderate discomfort, which may vary during the first 3 to 5 days, requiring medication tailored to their symptoms.

7.1 POST-OPERATIVE RECOMMENDATIONS

Do not plan any important activity after surgery. You must **rest**.

- **ULTRALASIK:** During the first week, avoid rubbing your eyes and closing your eyelids firmly so as not to induce wrinkles of the flap. Do not apply any pressure patch on the eye.

For 3 consecutive nights following surgery, while sleeping, you must wear a **protective eye cup** over the operated eye. The IRIS Ophthalmology Clinic will provide you with the plastic shields. Do not put a dressing under the cup.

- **Surface ablation: Avoid rubbing the operated eye** as long the corneal lens is in place.

Your vision will be blurry and your eyes sensitive to light.

- N. B.** During the first year, wear sunglasses with an adequate UV filter when outdoors.

7.2 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 order in which you instill the eye drops is not important.

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.

The laser surgery causes ocular dryness during the first 3 post-operative months. You must hydrate your eyes regularly during this period with the help of artificial tears.

- **ULTRALASIK**: hydrate your eyes every hour with artificial tears during the first few hours in order to help the flap adhere to the rest of the cornea
- **Surface ablation**: a bandage contact lens will cover your cornea during the 4 to 5 first days following the surgery. Use artificial tears frequently to maintain adequate lubrication of the lens.

Subsequently, the frequency and duration of use may be adapted according to the symptoms of dryness. If needed, you can get these artificial tears from your eye care professional or pharmacy, without a prescription.

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.

7.3 VISUAL RECUPERATION

- **ULTRALASIK**: The surgery is characterized by a rapid visual recovery period, allowing the majority of people to resume their activities **24 hours** after surgery.
- **Surface ablation**: It will take approximately **1 to 2 weeks** to resume activities after surgery. The vision will be improved when the bandage contact lens will be removed.

Stabilization of vision is generally acquired after 3 months. Healing time can vary from one person to another. This is why the quality of your vision can improve up to 12 months after surgery.

The greater the correction, the longer the recovery period will be. Don't worry if the quality of your vision does not appear perfect over the short term. It will improve with time.

It is frequent to notice a small difference of visual quality between both eyes. Ideally, you should always let your eyes work as a pair to ensure adaptation to your new visual condition. Also remember that binocular vision is always greater than monocular vision (one eye at a time).

7.4 RESUMPTION OF ACTIVITIES

7.4.1 WORK

- **ULTRALASIK**: You can return to work as soon as your vision seems good enough for you to perform your usual tasks (24 hours).
- **Surface ablation**: You will be able to resume your work as soon as the quality of your vision and your comfort will allow you (1 to 2 weeks).

Your eyes will be more easily irritated during the first few weeks which could make working on the computer and reading more difficult. You can use artificial tears to improve your comfort level.

If you work in an environment where there is dust or an increased risk of infection, you must wait 1 week before resuming your activities (e.g., gardening, mines, garage construction, etc.).

If your work involves an increased risk of impact on the eye, you must wait at least 2 to 4 weeks before resuming your activities (e.g., police, fire protection, martial arts, combat sports, racquet sports, etc.).

If necessary, the clinic could provide you with a letter to justify your absence.

It is recommended that you wear safety goggles, as deemed necessary during the first 3 months.

7.4.2 BATHING, SHOWERING AND SWIMMING

You can take a shower or a bath already the day after 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.

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.

Water skiing must be avoided for at least 8 to 12 weeks due to an increased risk of falling and of water entering the eyes abruptly.

7.4.3 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 eyeliner, 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..

7.4.4 DRIVING

- **ULTRALASIK:** Over 95% of people operated on can drive their car the day after surgery.
- **Surface ablation:** The waiting period is normally 1 to 2 weeks after the surgery.

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.

During the first days, after you start to drive your car, drive carefully because your vision could appear slightly clouded and your depth perception could be slightly altered.

It is normal to perceive halos or stretching of lights at dusk for about 4 weeks. Your sensitivity to contrast can be slightly reduced during the first month, affecting evening driving.

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).

7.4.5 SPORTS

Most sports can be resumed, with appropriate protective eyewear, after 1 week.

7.4.6 TANNING

The use of tanning cabins is not recommended during the first 4 weeks. Exposure to ultra-violet rays and the intense heat can interfere with healing of the cornea and increase dryness of the eyes.

Use U.V. protection eyewear during exposure as well as artificial tears before and after.

Chapter 8

Post-Operative Recovery

8.1 IMMEDIATELY AFTER SURGERY

During the first **4 to 5 hours** after **ULTRALASIK** surgery and during the first **4 to 5 days** after **surface ablation surgery**:

- Your vision will be **blurred**. You will have the impression of seeing through a filter or a frosted window.
- It is normal for the **eye(s) to weep** and to feel a burning sensation. If this makes you uncomfortable, you may take a pain reliever every 4 hours (Tylenol).
- Your eye(s) will be very **sensitive to light**. The IRIS Ophthalmology Clinic will supply you with sunglasses to protect your eyes from sun and wind.

It is possible that you will notice one or several **small red spots** on the white of the eye(s). These tiny haemorrhages are of no consequence and will disappear within the following 2 weeks.

Your eyes will be sensitive to the touch. This sensitivity will prevent you from rubbing your eye(s) vigorously at the beginning, but will fade away gradually during the 3 months following the surgery.

8.2 DRY EYES

Laser surgery causes a temporary reduction of the cornea sensitivity and, consequently, an interruption of the reflex involved in the production of tears, which keep the cornea continually hydrated.

It is normal to experience dry eyes after surgery, particularly during the first month. This symptom can, in fact, persist for more than **3 months**.

Dryness can produce different symptoms:

- Sensation of tingling or grains of sand in the eye(s);
- Burning;
- Sticking eye(s) at awakening;
- Clouded vision, changing from one day to another;
- Perception of halos around lights;
- Glare.

Regular use of artificial tears (3 to 4 times per day) for the first 3 months allows reducing the intensity of symptoms.

8.3 PERCEPTION OF HALOS AND GLARE

It is normal to perceive halos or elongated lights for a period of **3 to 4 weeks** after surgery.

This symptom is mainly due to the temporary reduction of the transparency and consistency of the cornea during recuperation. You will have the impression of seeing lights through a fine mist. The perception of halos could be more significant or longer if:

- You have been treated for a high degree of myopia, hyperopia or astigmatism;
- You have dry eyes;
- You have a monovision type correction (one eye corrected for far and the other for near vision);
- You have a residual vision defect (over- or under-correction);
- You have large pupils in darkness, which exceed the diameter of the treatment zone used during your laser correction. In rare cases, these halos could be permanent.

Chapter 9

Post-Operative Results

9.1 FREEDOM FROM EYEWEAR

In the majority of cases, the final correction is about ± 0.50 dioptre from the initial objective. This allows most people to regain a level of freedom without eyewear for most of their daily activities, including driving their car.

The laser is calibrated prior each procedure to ensure both its efficiency and its precision. It is, however, **impossible to guarantee 100%** result following a laser correction.

Because it is an organ and not a mechanical object, the cornea's response may vary from one person to another, either during the procedure, or while healing. Depending on its condition, the cornea may over- or under-respond to the treatment.

A recent study on patients who underwent ULTRALASIK surgery at the IRIS Ophthalmology Clinic reveals that 97.5% of them are either satisfied or very satisfied with the result of their surgery.

9.2 LIKELIHOOD OF HAVING AN ENHANCEMENT PROCEDURE

You may consider an enhancement procedure if the visual result achieved after surgery does not allow you to be free from eyewear in most of your daily activities with regards to your distance vision.

Thus, enhancement procedures are rarely considered before 3 to 6 months following the first surgery. It is important to wait for the complete stabilization of the healing process.

With laser modern techniques, we estimate the surgical enhancement rate to be approximately:

- 1% per dioptre of myopia to be corrected;
- 10% per dioptre of hyperopia to be corrected;
- 5 to 10% per dioptre of astigmatism to be corrected.

For example, if you have myopia - 4.00 D the odds would be 4% that you might need an enhancement procedure. For hyperopia of +3.00 D, the odds would be 30% that you might need a second intervention. For astigmatism of -2.00 D, your odds of an enhancement procedure would be increased by 20%.

9.3 OCCASIONAL WEAR OF CORRECTIVE LENSES

The enhancement surgery does not always allow an improvement in the eyesight, especially when the residual defect to be treated is lower than ± 0.75 dioptre. The ophthalmologist will have to evaluate both the relevance and the safety of a second intervention.

If you are slightly over- or under-corrected according to the surgery objective, the ophthalmologist or the optometrist could suggest the occasional wearing of **eyewear** to correct perfectly your vision. This will depend on your degree of tolerance in difficult or challenging situations.

If you are over 40, you will eventually need to wear glasses for activities requiring close-up work (e.g., reading, computer work, etc.). **The laser surgery does not slow down the progression of presbyopia.**

9.4 POSSIBLE COMPLICATIONS

Like any intervention, laser surgery shows a certain risk of complication. By definition, a complication is an unpredictable event, which can result in a temporary or permanent reduction in the quality of the vision, one that **cannot be corrected with glasses or contact lenses**. The reduction is usually limited at one line on the visual chart and less commonly at two lines.

The probability of encountering a complication leading to a loss in quality of vision is less than 1 case out of 1000.

These complications can be of different nature:

- **Complication related to instrumentation.** Eye surgery could be cancelled or delayed to an undefined date if the safety and efficiency criteria cannot be ensured (e.g., malfunction of a surgical or sterilization machine, major electrical power lost, programming error, etc.).
- **Corneal ectasia or keratoconus.** Progressive deformation of the cornea, at medium or long term. Could cause a progression in myopia or the onset of an irregular astigmatism. Could require a correction through specialized corneal lenses, by the insertion of intracorneal rings (INTACTs) or, in rare cases, by corneal transplant.
- **Infection** (1 case out of 10,000). An emergency situation requiring intensive antibiotic treatment. May bring on a loss of corneal transparency, either temporary or permanent.

This complication is more common in surface ablation procedure than in ULTRALASIK, because the corneal epithelium is removed during surgery.

More specific to ULTRALASIK:

- **Diffuse inflammation of the cornea or “Sand of Sahara” syndrome (1 in 200-500).** This exaggerated inflammatory response of the cornea requires increased use of anti-inflammatory drops. Usually resolves without loss of vision after a few days. In rare cases, the ophthalmologist may have to raise the flap to irrigate the deposit inflammatory.

- **Folds or flap displacement.** Usually occurs in the short term, following excessive pressure on the flap or accident (e.g., a finger in the eye). This would require a rapid intervention (within 24 to 48 hours) by the ophthalmologist to re-lift and re-smooth the flap.
- **Corneal erosion.** Occurs when the delicate cells of the epithelium (the skin covering the cornea) are displaced by the friction of the microkeratome while cutting the flap. Whereas this condition is very rare, it may increase post-operative pain and inflammation. Some cases will require the wearing of a bandage contact lens for a few days.
- **Infiltration of epithelial cells under the flap.** Migration of cells normally found on the surface of the cornea under the flap. More common after a corneal erosion or a touch-up surgery. May progress to a long-term condition and require an intervention to re-lift the flap and clean the affected zone. This condition is sometimes prone to relapses. In rare cases, it can result in a thinning of the corneal tissue over the affected area.
- **Irregular or incomplete cut of the flap** (approximately 3 cases out of 1000). In this case, it is generally impossible to proceed with laser correction. The flap is re-positioned for healing and a new cut can be considered 6 months later. In rare cases, an abnormal scarring with a loss of vision may occur if the irregularities in the flap are significant.

More specific to Surface ablation:

- **Re-epithelialisation delay.** The epithelium removed before applying the Excimer laser may take more than 5 to 7 days to regenerate resulting in a persistent discomfort and a blurred vision.
- **Abnormal scarring or haze** (about 5 cases out of 100). Loss of transparency of the cornea, which reduces the visual quality. Usually, this opacity tends to fade with time. Otherwise, the ophthalmologist will prescribe anti-inflammatory drops. Additional follow-ups should be conducted.

- Cases of blindness as a result of laser surgery are practically nonexistent (1 case out of 40,000). Throughout his whole career, a surgeon will most likely never encounter such a situation.
- If a complication occurs during laser surgery, the ophthalmologist may immediately decide not to operate on the other eye.
- Most complications in laser surgery can be corrected in such a way that no significant symptoms will persist over the long term.
- If all goes well during the ULTRALASIK surgery, there is low risk that a complication could occur during the post-operative period.

Make an informed decision

Chapter 10

Choose the Iris Ophthalmology Clinic

10.1 SHOULD YOU CONSIDER LASER 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 laser surgery;
- those who **understand the potential risks and side effects** of such surgery.

Ce petit questionnaire peut vous aider à déterminer si vous êtes prêt pour la chirurgie laser:

	Yes	No
• Do you have a strong desire to be free of eyewear?		
• Does 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 laser surgery will be permanent and irreversible?		
• Do you understand that the refractive surgery will require that you submit to chek-ups at regular intervals? Will you have the time to go to these?		
• Do you understand that the results of a laser 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 IS OUR TOP PRIORITY

The safety profile of the laser surgery has greatly improved during the past 20 years, thanks to the introduction of new instruments, enhanced laser technologies which allow larger and smoother ablation zones, as well as improved eyetracking systems.

The first mandate of the IRIS Ophthalmology Clinic is to **respect and exceed 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;
- a humidity and temperature controlled-environment that ensures stability with regard to the effectiveness of the laser beam;
- surgical instruments coupled to an uninterruptible power supply (UPS) back-up in the event of a power outage;
- products that meet highest standards of effectiveness and safety;
- diagnostic and surgical instruments that make it possible to optimize the refractive outcome of the surgery (e.g., WASCA Aberrometer, ATLAS Topographer, Visante® tomography, Pentacam Eye Scanner);
- **a Carl Zeiss Meditec MEL-80™ laser** that allows a rapid customized ablation, respecting the natural curvature of the cornea for an optimal quality of post-operative vision;
- 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.

We hope that your fear of a complication does not prevent you from taking advantage of a vision free from eyewear! Think of the surgery as an outing in a car. We are all conscious of the remote possibility of being involved in a car accident, but this does not prevent us from using our vehicle each day to get around. And the reason is simple: it improves our quality of life!

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