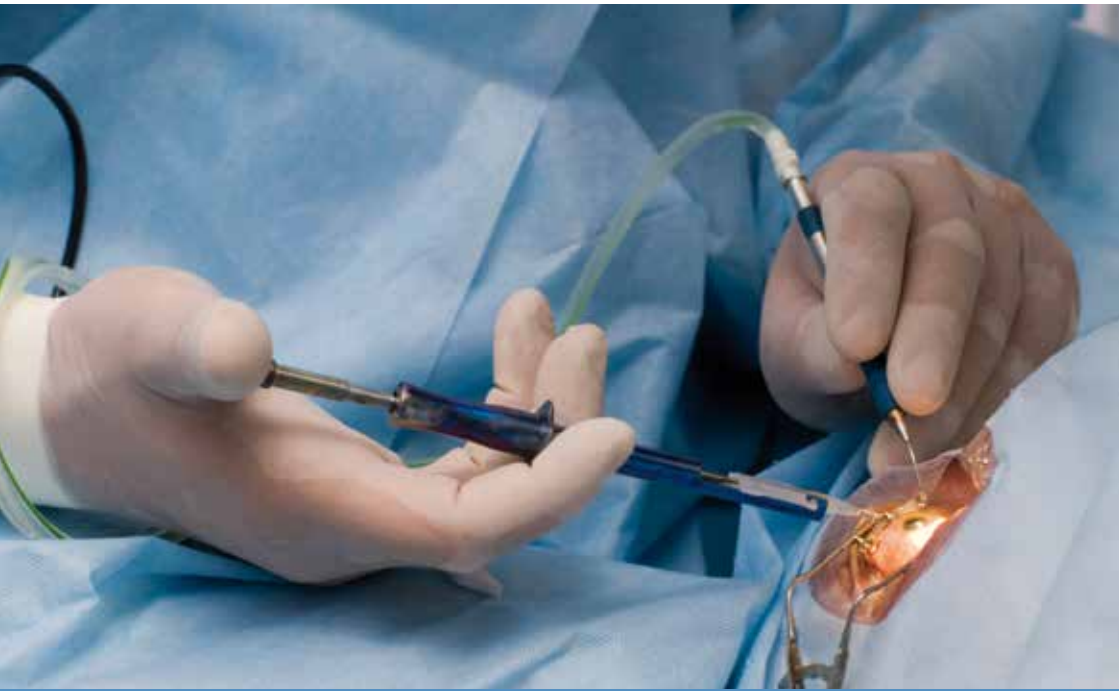




B R U S S E L S
E Y E D O C T O R S



A clear view on cataract surgery

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A clear view on
cataract surgery

1. What is cataract ?

The crystalline lens in the human eye is situated behind the pupil. Its function is to focus light on the retina so that images can be seen clearly. The optic nerve then carries the images to the brain.

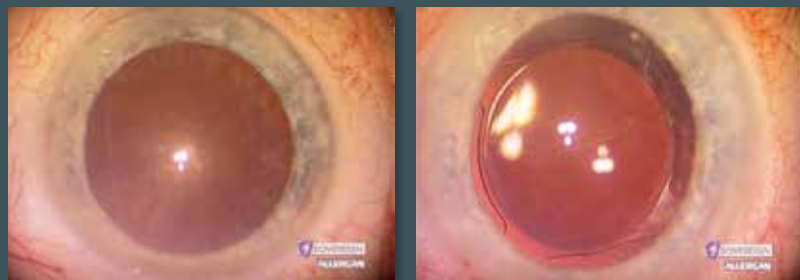
When cataract is present the crystalline lens becomes opaque and images are blurred.

• Causes

The most frequent cause of cataract is ageing. The normal protein structure of the crystalline lens is altered and becomes opaque. Most cataract patients are aged over 60.

In 5% of cases, cataract has some other cause:

- metabolic diseases such as diabetes
- eye diseases such as glaucoma or ocular inflammatory diseases (iritis, etc.)
- extended use of certain types of medication such as cortisone
- heredity
- traumas such as a blow on the eye or irradiation.



Before surgery

After surgery

2. Cataract surgery

• Symptoms

The way in which cataract affects the daily life of patients can vary, as can the speed at which it develops. One eye may be affected more than the other.

At the beginning it might be possible to correct the changes in eyesight by adapting the patient's spectacles. In some cases reading ability may improve while distance vision deteriorates. In other cases double vision develops. Often patients become more sensitive to light; at night spotlights become starry and driving may become dangerous.

In a later stage the vision of a cataract patient may become cloudy, as if looking through a waterfall! – hence the name “cataract”.

• Diagnosis

This is made by the ophthalmologist after thorough examination of the eye, using a slit lamp microscope and other diagnostic equipment, to ascertain whether cataract is the cause of the diminishing vision and exclude any other diseases at cause.

• Treatment

No local or general medication can prevent or cure cataract. The only effective treatment is through surgery, in which the opaque lens of the patient's eye is removed and replaced by an artificial lens or implant. It is up to the patient to decide – together with the ophthalmologist – whether his eye problems are affecting his daily life and well-being (reading, driving, watching television, etc.) to such an extent that he wants the surgery to be performed. In making the decision the patient will have to strike a balance between the relief of the ocular discomfort which he hopes to experience and the very slight risk of complications that might result from the surgery.

Cataract surgery is probably the surgery performed most frequently on human beings. It has a high success rate: 98 % of patients experience a significant improvement in their vision.

Cataract can be operated on at any age. The rate of deterioration of eyesight caused by cataract varies from patient to patient.

Surgery will only be urgent where cataract causes swelling of the lens resulting in increase of eye pressure, considerable pain and possible blindness.

• Pre-operative examination

The power of the artificial lens needing to be implanted is calculated by means of an echography of the eye (biometry), linked to a specific computer programme.

The patient's general practitioner will be asked whether there are any contra-indications to having the surgery performed under local anaesthesia. Often an electro-cardiogram and a routine blood test will be performed, if not already done during the past six months.

• Anaesthesia

Most cataract surgery is performed under topical anaesthesia, i.e. by means of drops.

Dr. Vryghem was one of the first eye surgeons to introduce this method in Europe (1996) and to use it systematically. The anaesthetic drops are administered shortly before the surgery.

Although aware that the surgeon is performing the operation, the patient will feel no pain. Nervous patients may be given a tranquilliser.

In rare cases the anaesthesia may be by injection, general anaesthesia being administered in the most exceptional cases, i.e. psychiatric patients.

• Day surgery

Most cataract surgery is ambulatory, i.e. the patient walks in half an hour before the time scheduled for the procedure and leaves half an hour later. One or two controls are done in the week following surgery to make sure that all is well and to detect any sign of infection.

• Organisation of the surgery

Three days prior to surgery the eye is disinfected by antibiotic drops to be administered by the patient.

The pupil of the eye that will be operated on has to be dilated. This can be done by means of inserting a tablet or drops in the eye one hour prior to surgery or by means of drops administered 1 hour prior to surgery. In some cases dilatation is achieved by the use of a product at the beginning of the procedure. The surgery is performed in a sterile operation ward. The area surrounding the eye is disinfected and covered by sterile drapes.

The procedure itself takes ten to fifteen minutes. The patient is asked to look into the light of the operation microscope.

A transparent protective cap is not needed immediately after the procedure but must be worn at night for one week.

• Post-operative care

Antibiotic and anti-inflammatory drops must be inserted by the patient during the six weeks following surgery. The patient must avoid direct trauma to the eye, the carrying of heavy weights and contact with dusty environments.

In most cases the patient's distance vision will be satisfactory without glasses; for reading, however, glasses will be needed if a monofocal implant lens has been used during the procedure. A prescription for new glasses will be delivered after six weeks.

• Possible complications

Complications in cataract surgery are exceptional. The most severe complication would be an **intra-ocular infection**. This occurs in 1 on 2500 cases. In 4 on 1000 cases a problem during surgery could cause a **retinal detachment**. In that event an additional surgery is required.

• Long term results

In one third of patients the lens capsula may become opaque months or years after surgery: this is called **secondary cataract** or posterior capsular opacification. Treatment consists of making an opening in the cloudy lens capsula (capsulotomy) by means of a YAG-laser, which will produce recovery of vision from the following day.

3. History: techniques in cataract surgery

- **Microscopes and micro-instruments**

Cataract surgery has changed dramatically during the past twenty years. The use of operation microscopes and intra-ocular lenses, and progress in instrumental micromechanics, has resulted in new surgical techniques which minimise the trauma and maximise the visual results.

Until the 1970s the cataractous lens was completely removed by means of a cryode, a probe specially equipped to freeze surrounding tissues (**intracapsular cataract extraction**), through a large incision of up to 13 mms without insertion of an implant lens. Several sutures were needed. After surgery the patient's vision had to be corrected either by the use of thick "aphakic" glasses or permanent contact lenses. The glasses were heavy to wear, impractical because of their magnifying effect and limitative of the patient's visual field. Moreover, they could not be prescribed if only one eye had been operated on. Contact lenses offered a great improvement but fitting them was difficult and they carried the risk of both inflammation and infection.

Since the early 1970s **implant lenses**, designed to replace the natural lens, have been inserted in the anterior chamber of the eye between the iris and the cornea. In some cases they have caused oedema of the cornea or chronic glaucoma (excessive eye pressure).

In **extracapsular cataract extraction** only the core of the opaque lens is removed manually through an incision in the lens capsule, the outer part of the lens, leaving in place an "envelope" in which an implant lens can be inserted: the implant lens is then placed in the posterior chamber behind the iris in the original anatomical position of the natural lens.

The outer incision in the eye is only 8 to 10 mm in length but still requires some sutures. For this technique an operation microscope is required. Complications are few if the surgery is properly performed, and thus it has become the preferred technique since the early 1980s.

- **Phako-emulsification, no-stitch surgery and foldable lenses**

In 1962 Charles Kelman (USA) developed ultrasonic **phako-emulsification** which enables the core of the cataractous lens to be fragmented and extracted through a 3 mm incision. It took thirty years and several technical improvements before his invention was applied worldwide. Implants with a smaller optical zone were used but still needed enlargement of the incision up to 5 mm and one or two sutures to close the wound.

The advent of **foldable implant lenses** that can be inserted through a small 3 mm incision has brought us to "no-stitch cataract surgery". The advantages of small incisions without sutures are that they do not produce corneal deformation and they thus avoid astigmatism, visual recovery is faster and the refractive result remains stable.

- **Topical anaesthesia or anaesthesia by drops**

The next revolution came in the mid-90s. Up to that time all cataract surgery was performed under local or - less frequently - general anaesthesia. Local anaesthesia was administered by "retro bulbar" injection, i.e. a painful or disagreeable injection behind the eye, which was potentially dangerous because it could cause orbital hematoma (bleeding behind the eye), perforation of the eyeball damage to the optic nerve or post-operative ptosis (lowering of the eyelid).

Anaesthetic drops prevent all pain, even though the patient is still able to move his/her eye and see with it. An experienced surgeon can perform the cataract operation using this type of anaesthesia, as long as he instructs the patient to look at the bright light of the microscope and guides him/her through the procedure.

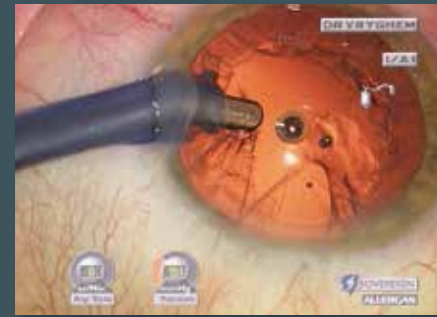
However, there are circumstances in which drops cannot be used and an injection has to be administered. This applies to very dense or hard cataracts, to eyes presenting very small pupils or to cases where cataract surgery is combined with other procedures such as glaucoma surgery or corneal graft.



2.0 mm incision with a diamond blade



Capsulorhexis: opening of the anterior capsule



Irrigation and aspiration of the debris



Insertion of a foldable lens



An eyelid-spreader holds you from blinking



Phaco-emulsification: fragmentation of the crystalline lens by means of ultrasounds



Implant is in the bag, incision without sutures

4. Refractive lens surgery

The emphasis in cataract surgery has moved from a technique primarily concerned with the safe removal of the cataractous lens to a procedure refined to yield the best possible postoperative refractive result, enabling the patient to dispense with glasses not only for distance vision but even for reading and for intermediate vision.

Today attention is directed both to **eliminating pre-existing myopia and hyperopia** and to **treating astigmatism**. Lens power calculations have been perfected and refined, and new means of correcting postoperative refractive surprises caused by lens power miscalculations are available.

Multifocal intraocular lenses allow us to take up the challenge of **correcting presbyopia**.

• Lens power calculation

The key to obtaining excellent refractive results after cataract surgery is biometry, i.e. accurate measuring of the length of the eye and the curvatures of the cornea, which are incorporated in modern lens power calculation formulae to yield accurate and consistent results. Classical echography (applanation biometry), using a probe in direct contact with the cornea, still gives good results but may induce postoperative refractive surprises if the probe flattens the cornea too much. New methods, such as immersion biometry or non-contact partial coherence optical interferometry (Zeiss IOL Master) provide extremely accurate measurements, are more convenient for the patient and take up less technician time.

• Indication

In **patients over 45 years** – who have lost their accommodation power and who suffer from myopia (up to -30D) or hyperopia (up to +14D) a refractive lens surgery can be performed. Their crystalline lens is then replaced by certain strength of artificial lens, which is calculated in order to correct their myopia or hyperopia.

This technique is called **refractive lens exchange**. The procedure is very similar to cataract surgery but is performed not due to the opacification of the crystalline lens but for refractive means: allowing the patient to be free of glasses in as many situations as possible.

• Astigmatism

Incisions in cataract and refractive lens surgery are getting smaller and smaller and thus induce no deformation of the cornea and astigmatism. In case of pre-existing astigmatism there are 2 possible strategies:

- Pre-existing astigmatism can be corrected during cataract surgery by means of a **“toric” intraocular lens** into which the astigmatism correction has already been incorporated. This lens has to be placed in the proper meridian.
- For small astigmatism up to 5 diopters **relaxing incisions** into the steep meridian of the cornea (arcuate keratotomy or limbal relaxing incisions) allow to diminish the astigmatism.
- In case of residual astigmatism after surgery an **excimer laser treatment** (PRK or LASIK) allows us to fine-tune the result in an ulterior step.

• Presbyopia

The next step forward in refractive cataract surgery is the treatment of presbyopia during lens removal. Now that modern cataract surgery has made it possible to obtain for most patients a good distance vision without glasses, the next challenge is to provide them with good reading ability without glasses, thus simulating accommodation (i.e. the ability of the normal crystalline lens to adjust for distance and near vision). This would greatly enhance the quality of life for most patients.

A certain independence from reading glasses can be partially created with monofocal implants where the dominant eye is adjusted for distance vision and where a slight myopia is created in the other eye. This allows

the patient - after a period of adjustment - to function without reading glasses in a lot of circumstances. This situation is called **Monovision**. Depth perception can be slightly altered although only a very slight number of patients experience trouble in driving. In certain cases this monovision can be simulated before surgery by a contactlens test to sort out whether the patient can adapt to the difference between both eyes.

This technique is nowadays less applied due to the recent progress of **multifocal implant lenses**. The surface of these implants has been modified (by diffractive or refractive circles) in order to allow distance and near vision. The accommodation process is simulated (this is the crystalline lens power to adapt for near and distance vision).

Dr. Vryghem was the first surgeon in Belgium to place multifocal implants in 1997 (AMO Array). The quality of the first lenses was not optimal: patients complained about halo's at night and an insufficient near vision. Since 2010 the quality of multifocal implants has improved dramatically especially with the appearance of **trifocal implants**. Trifocal implants have 3 different focal points and are developed in order to allow a good distance vision, a good near vision (40 cm) and even a good intermediate vision (60-70 cm). The intermediate distance is used for PC work. These implants are an adequate solution for the younger presbyopic patients who work often on PC. These trifocal implants are of Belgian origin. Their design was developed by PhysIOL, a company located in Liège, who has a patent on the implants.

Only in a very little number of cases complaints about halo's round light sources are registered.

This progress explains why refractive lens surgery (Refractive Lens Exchange) with trifocal implants is currently the preferred technique to correct presbyopia.

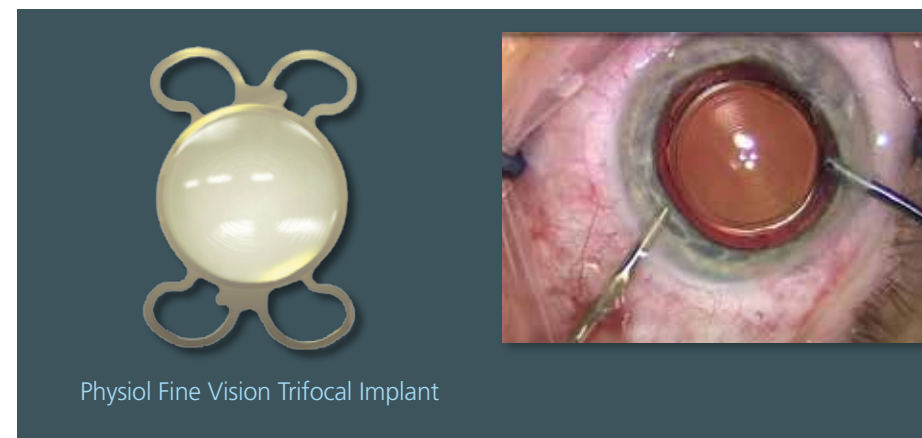
• Long term results

In one third of patients the lens capsule may become opaque months or years after surgery: this is called **secondary cataract** or posterior capsular opacification. Treatment consists of making an opening in the cloudy lens capsule (capsulotomy) by means of a YAG-laser, which will lead to recovery of vision as soon as the next day.

Some patients with multifocal implants complain about halo's round light sources at night.

• Possible complications

As in cataract surgery there always remains a very slight risk of complications: the most severe complication would be an **intraocular infection** (1/2500).



• Final thoughts

Current advances in surgical technique, biometry and lens power calculation have allowed us to move one step closer to the ideal of achieving “emmetropia” in all our cataract patients - i.e. a good vision without glasses for distance.

In turn, these refinements in postoperative refractive results have increased our ability to use multifocal lenses and offer this technology to our patients as a means of addressing presbyopia and reducing dependence on spectacles.

Intraocular surgery is becoming a common form of refractive surgery not only for our cataract population but also for **people older than 45 years who would prefer to dispense with their spectacles.**

5. Practical organization

• Before surgery

1. The date for surgery will be fixed on the day of the preoperative appointment. If both eyes must be treated, surgery will be scheduled with an interval of 1 or 2 week(s) in between both eyes. The exact **time** of surgery must be confirmed by phone to Dr. Vryghem’s practice **+32 2 741 69 99** on the working day before surgery.

2. The patient’s general **practitioner** will be asked whether there are any contra-indications to having the surgery performed under local anaesthesia. In most cases an electro-cardiogram and a routine blood test will be performed, if not already done in the past six months.

In case of doubt the general practitioner may refer the patient to a heart specialist for extra investigations.

These examinations should be done at least one week before the scheduled date for surgery.

The results of these tests must be mailed or faxed to us.

3. A **prescription for drops** will be given to the patient: these can be obtained from a chemist.

- Tobrex (antibiotic) and Indocolllyre (anti-inflammatory): these drops are to be inserted into the eye that is to be operated on, in the three days before the surgery, 3 times a day, with an interval of 5 minutes between each drop.

- Tobradex, to be used after surgery.

4. **Medication prescribed by the general practitioner or specialist** must be continued even on the day of surgery. This applies notably to anti-coagulants such as Sintrom, Aspirin, etc. - if the surgery is to be performed under topical anaesthesia.

• Day surgery or hospitalization

Most cataract surgery is ambulatory, i.e. the patient walks in one hour before the time scheduled for the procedure and leaves a quarter of an hour later. The surgery can be scheduled at Dr. Vryghem's private practice, Brussels Eye Doctors, or at the Clinique du Parc Léopold in Brussels or at the Clinique de la Basilique in Brussels.

• Dr. Vryghem's Practice

Brussels Eye Doctors
(ground floor)
Boulevard Saint-Michel 12-16
1150 Brussels (Woluwé Saint-Pierre)

T +32 2 741 69 99

Dr. Vryghem's Practice is located very close to Montgomery square at the east of Brussels and is easily accessible.

Metro station Montgomery and a taxi station are located at walking distance of the practice.

• Eye-Clinic of the Clinique du Parc Léopold

(ground floor)
Froissartstreet 38
1040 Brussels (Etterbeek)

T +32 2 287 51 11

• Localisation

Close to the Schuman Roundabout, Parc Leopold Clinic lies at the heart of the European Quarter.

The main entrance is located on the Froissartstreet at 300 meters of the Schuman roundabout (CEE) and at 50 meters of the Place Jourdan.

• Clinique de la Basilique

Rue Pangaert 37
1083 Brussels (Ganshoren)

T +32 2 434 21 11

• Localisation

The Basilique Clinic is situated in northern Brussels 200 metres from the Koekelberg Basilica.

• Organization of surgery

Surgery is performed at Dr. Vryghem's private Practice (Brussels Eye Doctors) or at the Eye-Clinic of the Clinique du Parc Léopold or at the Clinique de la Basilique.

- On the **working day preceding surgery** you need to call Dr. Vryghem's practice to confirm the exact time of surgery: **+32 2 741 69 99**
- **On the day of surgery:**

If the operation is planned at the Clinique du Parc Léopold or at the Clinique de la Basilique the patient will register 1 hour before surgery at the admission's desk of the Eye-Clinic of the Clinique du Parc Léopold.

If the operation is planned at Dr. Vryghem's practice, Brussels Eye Doctors, the patient has to be present 30 minutes prior to surgery.

The pupil of the eye which is to be operated on has to be dilated before surgery. This can be done:

- by means of a tablet inserted in the eye to be operated 1 hour prior to surgery. This tablet will be inserted by the medical staff at the arrival of the patient.
- by means of drops instilled every 15 minutes in the hour before surgery

In some cases dilatation will be obtained by the administration of a product in the surgery ward at the beginning of the procedure.

- In special circumstances **hospitalisation** may be considered, in which case the patient enters the clinic the afternoon before surgery and leaves one or two days later. The patient will need to present himself at the general admission desk of the Clinique du Parc Léopold (first door at the right after the general reception desk) with his preoperative questionnaire completed by Dr. Vryghem and his preoperative results (ECG and blood analysis). Two checks are done during his stay at the clinic.

• After surgery

Immediately after surgery you can eat and drink. If the patient experiences slight discomfort a painkiller such as Dafalgan or Perdolan can be taken.

In case of abnormal pain or worry he/she should contact Dr. Vryghem through the Practice:

1/ During working hours

+32 2 741 69 99

2/ Outside working hours

+32 475 71 08 71 on Dr. Vryghem's mobile number

If Dr. Vryghem is unreachable, please contact the emergencies of the Clinique du Parc Léopold: **+32 2 287 50 64**

One or 2 checks are scheduled in the week after surgery to sort out if all is well and exclude any sign of a possible infection.

In the days after surgery the patient must avoid direct trauma to the eye, carrying of heavy weight and contact with water or dusty environments. When bending, please do not bend over but go down gently by bending your knees.

The patient should apply drops for 6 weeks:

- Tobradex one drop 4 times a day for 3 weeks, but reducing gradually:
one drop 3 times a day for 1 week, one drop 2 times a day for 2 weeks,
one drop once a day for 1 week.
- Indocolllyre one drop 3 times a day for 3 weeks or until the bottle is empty

The patient will have to wear a protective transparent eye-cap each night during one week after surgery to avoid rubbing the eye.

The patient's vision and any possible discomfort will gradually clear.

• Final check

A final check is done five to six weeks after surgery, in which the patient will receive a definitive prescription for his spectacles. In the majority of cases the spectacles will be for reading only.

6. Costs of the surgery

• In one-day-clinic/ambulatory

2 or 3 months after surgery the patient will receive an invoice from the clinic showing the individual items of cost:

- the clinic's day surgery standard rate of charge
- pharmaceutical costs, including the cost of the implant lens (which is partially reimbursed by the Belgian social security service)
- medical fees (basic fees and supplements)
- miscellaneous charges

For each item of cost the amount covered by the Belgian social security service and the amount payable by the patient (including room charge and medical supplements) will be shown.

Medical fees are increased by a maximum of 300%.

• In the event of hospitalization

2 or 3 months after surgery the patient will receive an invoice from the clinic showing the individual items of cost:

- the clinic's fixed rate for hospitalization
- pharmaceutical costs, including the cost of the implant lens (which is partially reimbursed by the Belgian social security service)
- medical fees (basic fees and supplements)
- miscellaneous charges

For each item of cost will be shown the amount covered by the Belgian social security service and the amount payable by the patient (including room charge and medical supplements).

Medical fees are increased by a maximum supplement of 100 % in a 2 bed room and a maximum of 300% in a private room.

• **At Dr. Vryghem's practice**

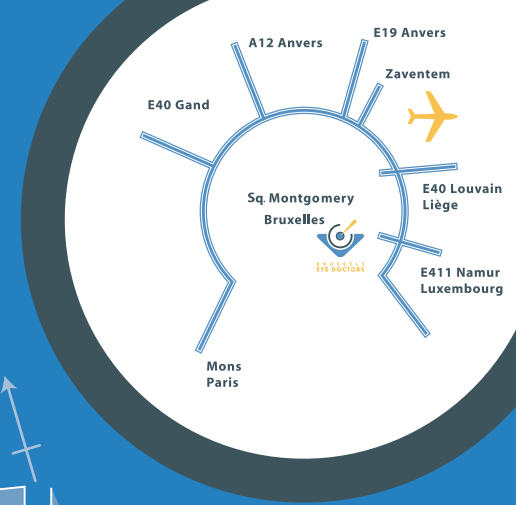
During the preoperative examination a bank transfer is handed to you.
The expenses for surgery are paid:

preferably at the latest 3 days before surgery by bank transfer
or on the day of surgery:

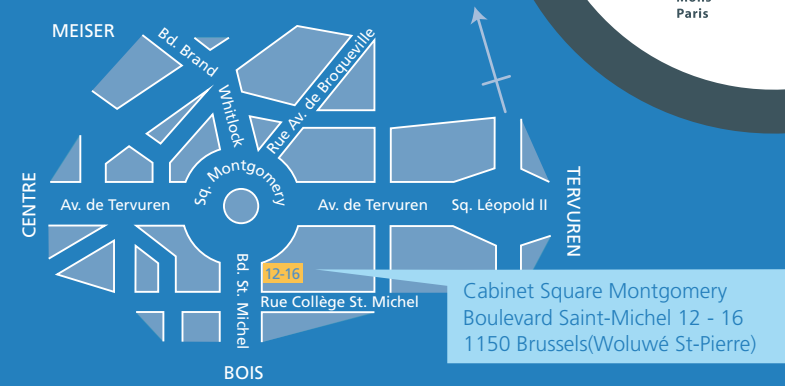
- by bancontact
- by credit-card
- cash

The proof of payment/receipt will be delivered on the day of surgery.

7. Localisation



Cabinet Square Montgomery



Clinique du Parc Leopold





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EYE DOCTORS

www.brusselseyedoctors.be | www.vryghem.be