



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



A clear view on refractive surgery

Dr J. C. Vryghem

www.vryghem.be | www.brusselseyedoctors.be

Introduction

Are you interested in a future without contact lenses or glasses?
Would you like as much information as possible about refractive surgery options?

We have organized all this information here for you!

The aim of this brochure is to inform you about the various surgical options available to treat your myopia, hyperopia or astigmatism. If you would like further information, please visit our websites: www.brusselseyedoctors.be or www.vryghem.be.

In order to be fully informed right from the start you need information about the equipment used: initially the diagnostic equipment used during the preliminary examination (topography, measurement of thickness of the cornea, etc.) to analyze your eyes and to check whether you are a good candidate for refractive surgery, but also about the actual type of laser to be used.

A further factor not to be underestimated in the decision-making process is the choice of an experienced surgeon. Someone who gives you the facts, has an answer to all your questions, and is able to provide concrete results and statistics.

Brussels Eye Doctors strives for high-quality service, backed by Dr Vryghem's many years of experience using the most advanced equipment in his practice.

After reading this brochure, and after a full eye examination to determine whether you are a good candidate for an operation and what technique should be applied in your particular case, you will be ready to serenely make your decision for treatment.

Table of contents

1 What are refractive errors?	4
2 Patient selection and preoperative examination	6
3 Surgical techniques	7
3.1 Incisional techniques	7
RK (Radial Keratotomy)	7
3.2 Excimer Laser Techniques	8
PRK (Photorefractive Keratectomy)	8
LASEK (Laser-Assisted sub epithelial Keratomileusis) and Epi-LASIK	9
LASIK (Laser-Assisted in Situ Keratomileusis)	9
3.3 Femto-LASIK	11
3.4 Intraocular lens techniques	15
Phakic implants	15
Refractive lens surgery	16
Implantation of a supplementary intraocular lens	19
3.5 Techniques of implantation of a corneal inlay to correct presbyopia	20
4 Dr J. C. Vryghem's profile	23
5 Dr Vryghem's team	24
6 Practice Infrastructure	24
7 Location	26

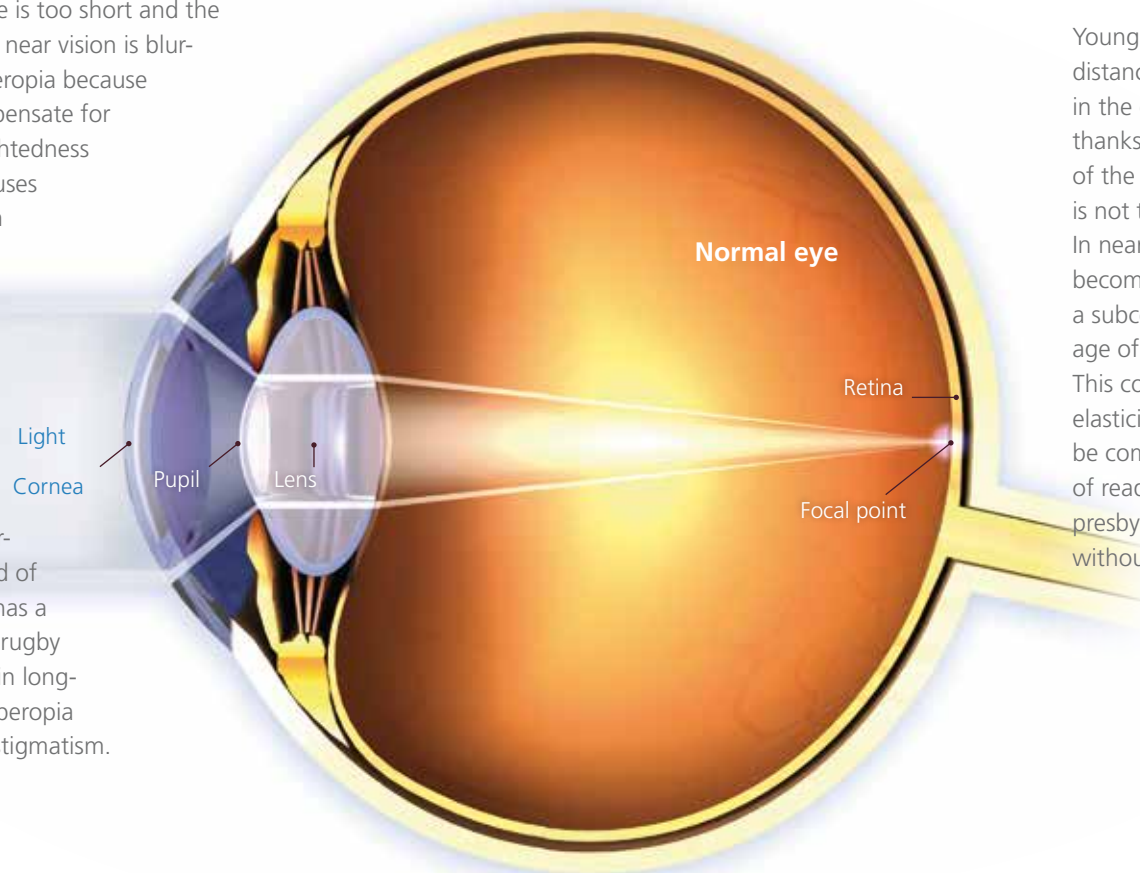
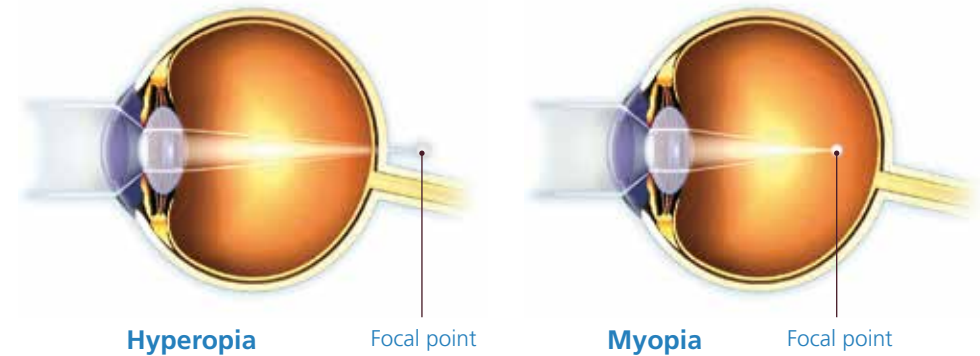
1. What are refractive errors?

In a normal eye the incoming light rays are focused precisely on the retina. This means that the curvatures of cornea and lens and the length of the eye are perfectly in balance. In the case of a refractive error, the images seen by the eye are not focused on the retina. This results in blurred vision. There are different kinds of refractive errors:

In **myopia** (the degree of error is described as diopter) or short-sightedness, the eye is too long and the light rays are focused in front of the retina: The patient has a clear short-distance vision but long-distance vision is blurred. 25% of the adult population suffers from short-sightedness.

In **hyperopia** or far-sightedness, the eye is too short and the light rays are focused behind the retina: near vision is blurred. Young people compensate for hyperopia because their lenses are supple and able to compensate for the condition. That is why a mild far-sightedness causes no complaints since the patient uses the concave lens to focus the images on the retina. However, the lens loses its elasticity with ageing and hyperopia gradually becomes apparent. At first, the patient experiences blurred vision for near distance and gradually for long distance as well. The patient would need reading glasses earlier than other, normal patients.

In **astigmatism** the curvature of the cornea is not the same in every axis: instead of being round like a football, the cornea has a flat and curved axis: it is flattened like a rugby ball. This causes image distortion, both in long-distance and near sight. Myopia and hyperopia are often associated with a degree of astigmatism.



Young people, if need be with their distance glasses, are able to see clearly in the distance as well as close up, thanks to the accommodation efforts of the eye. In distance viewing the lens is not taut and has a flattened shape. In near viewing the lens automatically becomes more concave as a result of a subconscious reaction. Around the age of 45 we all become **presbyopic**. This condition is caused by loss of lens elasticity and adaptability, which must be compensated for by the wearing of reading glasses. Short-sighted presbyopics are often able to read without spectacles.

2. Patient selection and preoperative examination

All the above described refractive errors can be corrected by means of spectacles or contact lenses which re-focus light rays precisely on the retina. Advances in **refractive surgery** enable almost all refractive errors to be corrected with increasing predictability. Most techniques such as LASIK, PRK and RK alter eye focus by changing the curvature of the cornea. In myopia the optical zone (the center) of the cornea is flattened to reduce its refractive power. In hyperopia the cornea is curved to create extra refractive power. In astigmatism the asymmetric shape of the cornea is modified in the axis of the astigmatism. Techniques such as phakic implants or clear-lens extraction can correct refractive errors by virtue of the power of the implanted lens.

The type of surgery required is determined by a **pre-operative examination** of the corneal curvature (keratometry), corneal thickness (pachymetry), corneal diameter, pupil diameter, axial length of the eye (echography), eye pressure, ocular dominance and the patient's age. Soft contact lens wearers must remove their lenses 5 days before the examination, and rigid or semi-rigid lens wearers must do so 2 to 3 weeks before.

Refractive surgery can be considered for all **motivated and informed patients** aged over 18 years old with more or less stabilized refraction. Individuals satisfied with glasses or contact lenses will not necessarily be interested in surgery, while patients who have difficulty tolerating contact lenses or who have a profession or practice a sport in which high visual acuity without correction is useful (e.g., fire-fighters) may request an operation. It is best not to operate on patients who demand perfect results. The primary purpose of all refractive surgery is patient satisfaction, not necessarily 20/20 vision without correction. Prior to all possible operations, an evaluation is made with the patient to determine whether surgery will achieve the desired result. The patient is told that all refractive surgery techniques may not be entirely precise, and is informed of any risks or secondary effects as well as of the possible need for re-treatment.



3. Surgical techniques

3.1 Incisional techniques

RK (Radial Keratotomy)

Indication

RK enables the correcting of myopia up to -6 diopters. Today this technique is only rarely applied because modern laser techniques (LASIK, etc.) provide faster, better and more predictable results.

Surgery

This outpatient surgery takes about 15 minutes. Anesthesia is performed by means of drops. The surgeon makes deep radial incisions with a diamond knife in the periphery of the cornea. Eye pressure will cause the incised areas to bulge out, while the central area (optical zone) becomes flattened.

Results

This technique has proven to be effective and safe for correcting mild and moderate myopia. Studies have shown that young and severely myopic patients tend to develop overcorrection (hyperopization) after approximately 10 years.

Side effects without severity

The most frequent side effects are increased sensitivity to light, fluctuating vision, "starburst" images around light sources and increased night myopization.

Potential complications

Complications are rare and generally take the form of infections. The eyeball also becomes more fragile: a direct trauma may more easily cause corneal rupture after RK.



3.2 Excimer Laser Techniques

PRK (Photorefractive Keratectomy)

Indication

PRK enables mild or moderate myopias up to -5 diopters to be corrected along with hyperopia and astigmatism up to 3 diopters.

Surgery

This outpatient surgery takes about 15 minutes. Anesthesia is performed by means of drops. During the first stage the epithelium is removed. The corneal tissue is then removed with an Excimer laser to change the outer surface of the cornea and thus its refractive power. Once the anaesthetic has worn off, the eye may hurt, be tearful and feel gritty. The epithelium takes 2 to 3 days to cover the treated surface again. To speed up this process and decrease pain a "bandage" contact lens is applied for 3 days.

Results

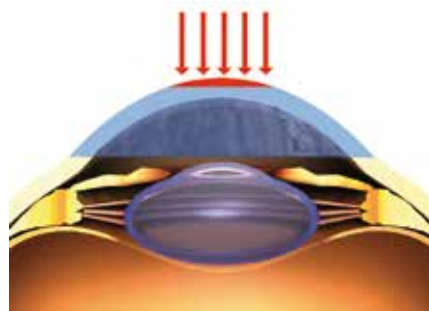
The surface of the cornea heals slowly. Functional vision returns after 3 to 5 days, fluctuating vision stabilizes after 3 months. With short-sightedness of -5 diopters or less, predictability is good.

Side effects without severity

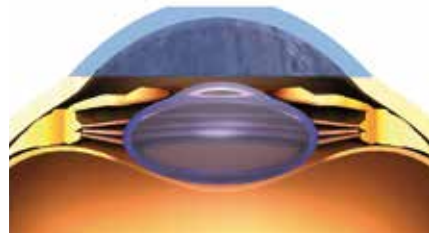
Some patients complain about slight mistiness, while 10% see halos around lights.

Potential complications

In rare cases, abnormal corneal scarring (haze) may develop, affecting visual acuity and generating glare.



Excimer laser treatment for myopia



LASEK (Laser-assisted sub-epithelial keratomileusis) and Epi-LASIK

Indication

LASEK and Epi-LASIK can be seen as a modern form of PRK. LASEK and EPI-LASIK may be used for patients where LASIK is unsuitable, often because of an overly thin cornea.

Surgery

This outpatient surgery is done under topical anesthesia, i.e. by means of drops, and takes about 15 minutes. In LASEK the epithelial layer is detached by using an alcohol solution and then rolled up. In EPI-LASIK the epithelium is detached mechanically by means of a keratome. Next, the corneal tissue is vaporized by the Excimer laser, which reshapes the surface of the cornea so as to change its refractive power. The epithelial layer is then repositioned under a bandage contact lens.

Results

Results are similar to those obtained with LASIK, at least when slight to moderate short-sightedness or far-sightedness needs to be corrected, but recovery of the corneal surface is much slower. Recovery of functional vision occurs after 3 to 5 days. The refractive result is stabilized within a period of 3 weeks to a few months. The advantage, compared to PRK, is that there is less pain after surgery.

LASIK (Laser-Assisted In situ Keratomileusis)

Indication

Myopias up to -12 diopters, astigmatism up to 6 diopters and hyperopia's up to +6 diopters can be corrected by LASIK with a degree of predictability hitherto unequalled. Since this technique doesn't provide a solution to presbyopic patients, a residual myopia of 1 diopter on the eye that is not dominant can be a solution, especially if the patient is 40 years or older. This technique is called "monovision" and enhances the reading capacity of the patient. In certain cases this monovision can be simulated before surgery by a contact lens test to sort out whether the patient can adapt to the difference between both eyes.

Surgery

LASIK is a refractive surgical technique in which Excimer laser treatment is performed under a protective layer of corneal tissue. This outpatient surgery is done under topical anesthesia (eye drops only) and takes about 10 minutes. Normally both eyes are treated in one surgical session. Firstly, the corneal flap is made using a motorized keratome. The flap consists of the epithelium, Bowman's membrane and a layer of corneal stroma. The flap has a thickness of 110 to 160 microns and is cut in such a way as to leave a hinge 0.45 mm wide which keeps it attached to the cornea. The flap is then folded back to allow the rays of the Excimer laser to remove the stroma with micrometric precision. In case of short sightedness, the laser will flatten the central cornea. In case of farsightedness, a tissue ring centred on the central cornea will be removed, thus steepening the cornea. The critical period during which the laser acts on the tissue lasts less than one minute. An "eye tracker" follows the gaze and ensures perfect centration of the treated zone, after which the flap is replaced.

The endothelial pump helps the flap adhere to the corneal bed and no stitches are required. This technique makes for rapid and painless healing with optimal patient comfort.

Results

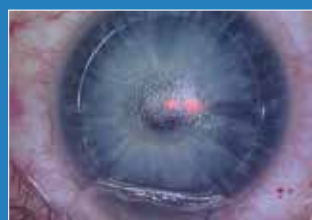
The healing process and inflammatory reaction are minimal. Healing occurs very swiftly and functional vision returns on the day after surgery. Temporary loss of contrast sensitivity may make reading more difficult at first.



Keratome*



Lifting the flap



Laser treatment

The predictability of results is unequalled by any other current refractive surgery technique. Refraction is stabilized after 1 to 3 weeks. 93% of patients with myopias between -2 and -12 diopters achieve corrections of +0.5 to -0.5 diopters. Results are more predictable for milder myopias. In the event of under-correction or imperfect result it is possible to improve the outcome by re-lifting the corneal flap and applying the laser again.

Side effects without severity

Patients often develop dry eyes, which can be prevented or treated with artificial tears. If necessary a silicone plug can be placed in the lacrimal duct that controls drainage. Some patients complain of halos around headlights at night, when the myopia to be corrected is severe or the patient's pupils are large. This trouble is usually temporary.

Potential complications

In very rare cases the flap may be incomplete or too small: the laser treatment must then be postponed for 3 months. If folds appear in the flap during the days following the treatment (because the patient has rubbed or squeezed his/her eyes) or if epithelial cells proliferate under the flap, the flap must be reopened. The epithelial cells need to be removed and the folds flattened out. This is not very common and post-operative infections are even rarer.

3.3 Femto-LASIK

Indication

The most recent development in LASIK surgery is Femto-Lasik. This technique is also described as "All-Laser" LASIK or "Bladeless" LASIK. With LASIK the corneal flap is made in a mechanical way by means of a blade and a motorized keratome (see LASIK- Surgery). The flap is created by means of the femtosecond laser.



Surgery

The Femtosecond laser uses the principle of photodisruption: infrared laser energy inserts a precise pattern of tiny, overlapping spaces just below the corneal surface. The laser operates at extremely high speeds: pulses of one quadrillionth of a second, or 1 femtosecond. Each femtosecond, the focused laser pulses divide material at the molecular level without the transfer of heat or impact to the surrounding tissue. Each pulse forms a microscopic bubble. A complete cut in the cornea is achieved by placing thousands of these

laser pulses next to each other. After the flap has been made, the surgeon lifts up the flap with an instrument designed for the purpose. The Excimer laser is then used to reshape the cornea in order to correct the refractive error (see LASIK-procedure). Finally, the surgeon replaces the corneal flap.

Results

The most important advantages of the "All-Laser" LASIK are:

Safer:

Reduced risk of flap-related complications such as incomplete cuts, flaps that are too small, or that are of bad quality (button-holes), which postpone the surgery for 3 months if occurring with microkeratome.

Thinner flaps:

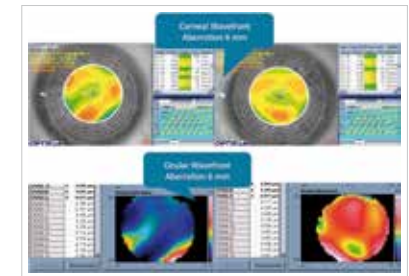
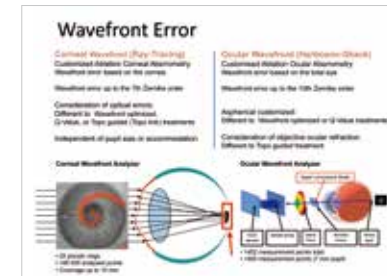
- The flap is so thin and the cut so precise that there are practically no astigmatogeneous side effects or significant aberrations.
- Thin flaps allow for more stromal bed to be saved: the stability of the cornea in the long term is better ensured, and larger refractive errors can be corrected by means of the LASIK technique.

Better predictability of the flap thickness:

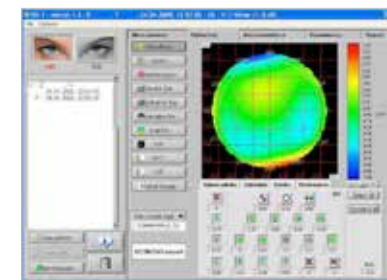
The femtosecond laser allows a better control of the parameters of the flap: the flap shape, the flap thickness and dimensions. This is unlike the flap made by keratome for which the surgeon only knows afterwards what the flap looks like. The mean flap thickness with Dr Vryghem's Femtosecond laser is 101 μ with a standard deviation of 9 μ m! The femtosecond laser also allows to create thinner flaps (e.g. 90 microns) and treat higher myopia's.

Customized treatments

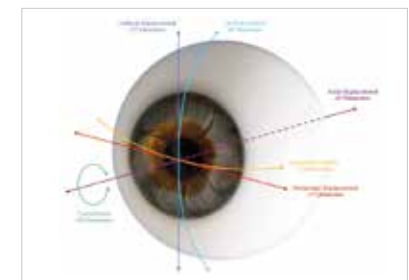
Customized optical ablation enables the cornea to be treated according to the real shape of the cornea or with allowance being made for aberrations in the cornea or in the eye as a whole. Aberrations are present in the eye because the eye is not a perfect optical system. Three techniques are available:



Topography-guided or wavefront-guided treatment



Wavefront analysis



Turbo eyetracker in 6 dimensions

Topography-guided ablations are applied for patients who have regular or irregular astigmatism, whether inherited or acquired, or who, after preliminary surgery, have decentered or too small optical zones and/or central islands. Instead of being centered on the center of the pupil, the treatment takes the real visual axis of the patient into account.

Wavefront-guided ablations allow the reduction of lower (myopia, hyperopia and astigmatism) and higher-order aberrations (coma, tilt, defocus, etc.). Wavefront technology (or wavefront aberrometry) is a well-established technology used by astronomers to improve images obtained by telescope. The image arriving via the telescope is distorted by atmospheric turbulence. This problem was solved by the development of adaptive optics in which the equipment samples part of the incident beam in order to analyze the

turbulence created. It calculates the deformation of the wavefront and then corrects it with a flexible mirror, so that the final image is free from distortion created by the atmosphere.

The customized treatment also allows to take the **cyclotorsion** of the eye into account. This is the rotation of the eye round its visual axis when the patient is lying down. A camera makes an image of the iris. The treatment profile is re-aligned in relation to the cyclotorsion of the eye and takes the image of the iris as a reference. The cyclotorsion control allows the laser to treat in an even more accurate way.

A customized LASIK treatment offers **significant advantages** in an initial treatment:

- Greater chance of obtaining 10/10 visual acuity or better;
- Smaller risk of losing best corrected visual acuity;
- A more regular cornea and a larger optical zone and hence a smaller risk of losing visual quality, night vision and contrast sensitivity;

For patients who have functional complaints after an initial treatment (e.g. radial keratotomy, excimer laser treatments or corneal scars) the customized treatment allows to regularize the surface of the cornea and reduce the visual aberrations whilst enlarging the optical zone. It gives greater prospects of restoring best corrected visual acuity.

3.4 Intraocular lens techniques

Phakic implants

Indication

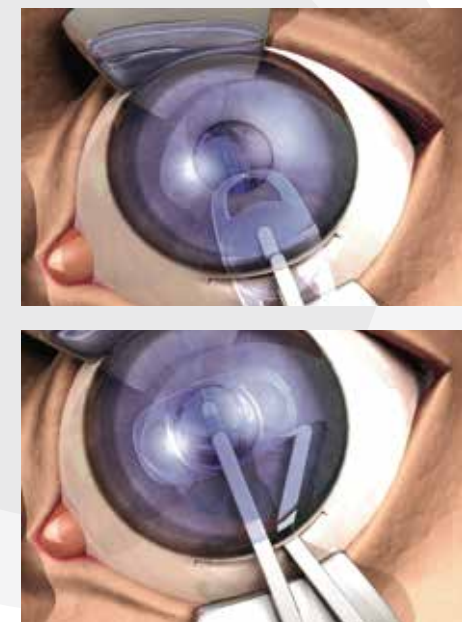
Severe myopias (-8 to -22 diopters) and hyperopias (+4 to +12 dioptres) can be treated surgically by inserting a phakic implant in the anterior chamber. Even higher refractive errors can be corrected using a combination of phakic implants and LASIK (Bi-optics). Since 2003 implants have been developed where an existing astigmatism is built into the optic of the implanted lens. (Toric Intra-ocular lenses).

Surgery

Unlike LASIK which affects the surface of the eye, this surgery is an intra-ocular surgery. It is performed under local anesthetic (injection or drops) and takes about 20 minutes. An **Artisan®**, lens in PMMA (Polymethylmethacrylate) is inserted through a small incision in the upper limbus into the anterior chamber and is fixed to the iris with 2 claws. The incision is closed by means of 5 stitches. Since 2005, a foldable silicone (**Artiflex®**) phakic implant has been developed, which can be inserted through an incision of 3.2 mm, thus not need any suturing. Patients with myopia up to -14 can be treated by this surgery.

Results

Similar implants have been used since 1979 to correct aphakia (patients with no crystalline lens). The model for myopia was developed by Dr Jan Worst (Groningen, The Netherlands) and has been in use since 1988. Similar implants were developed by him in 1995 to correct hyperopia. The major advantage of this technique is the predictability and speed of its results. This surgery often results in improved visual acuity and there is no contact with the patient's lens, which retains its accommodation capacity.



Side effects without severity

Some patients experience halo's around lights or glare. The patient has to adapt to a well-defined focal distance (e.g. 45 cm) and needs a good light source when reading small prints.

Potential complications

The presence of the implant inside the eye may cause a decrease in the number of the endothelial cells (cells on the inner side of the cornea) and may thus in the long term affect the clarity of the cornea. In the absence of surgical complications this loss does not exceed 10%. However, patients must undergo regular check-ups (once a year) with endothelial cell counts and the implant can be removed easily if necessary. As in all intra-ocular surgery there is a slight risk of infection.

Refractive lens surgery

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.

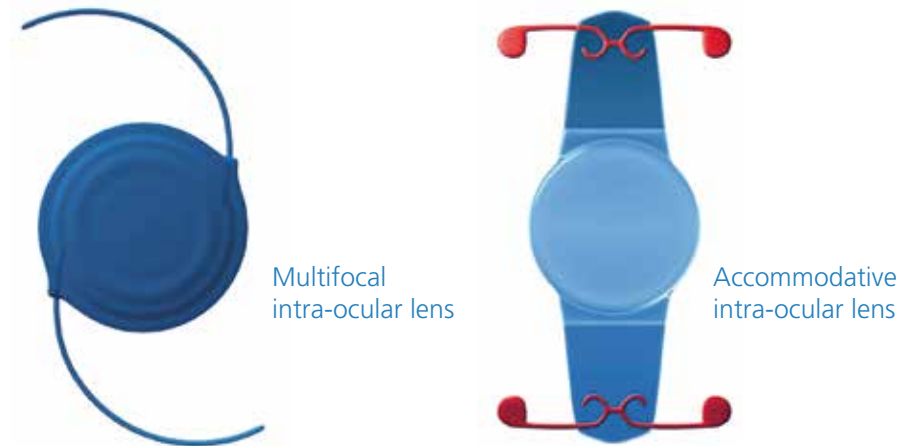


Results

The key to obtaining excellent refractive results after lens surgery is biometry (i.e., **accurate measuring of the length of the eye and the curvatures of the cornea**) which is 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 non-contact methods, such as optical biometry, provide extremely accurate and rapid measurements, and are more convenient for the patient.

New means of correcting post-operative refractive surprises caused by lens power miscalculations are available. Attention is directed today both to **eliminating pre-existing myopia and hyperopia and to treating astigmatism up to 5 diopters**.



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. 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. 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.

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 contact lens 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 often work on a 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).

Implantation of a supplementary intraocular lens

After a cataract surgery some patients can be disappointed because they still need to wear reading glasses or distance glasses, due to a residual correction. A technique now allows to implant a second intraocular lens on top of the already implanted monofocal lens in order to improve the distance vision or to allow the patient to dispense with reading glasses. This technique is called **supplementary intraocular lens implantation**.

Indication

Patients who had cataract surgery, where a monofocal intraocular lens was implanted and who still need to wear glasses in specific conditions: for reading, for driving the car, for long distance vision.

Surgery

The most frequently used supplementary intraocular lens is the Sulcoflex lens. The lens is placed between the iris and the already implanted monofocal intraocular lens and corrects the residual refractive error. The imperfect result obtained with the first lens is hence improved.

There are 3 types of Sulcoflex lens:

Sulcoflex lenses with a distance correction that are designed to correct the residual error after cataract surgery of those patients who cannot see at a distance without wearing glasses.

Multifocal Sulcoflex lenses without a basic correction for those patients who cannot read without glasses after a cataract surgery.

Multifocal Sulcoflex lenses with a distance correction for those patients who after cataract surgery cannot see at a distance nor read without glasses.

The procedure is not complicated and takes only little time as the original crystalline lens does not need to be replaced

Results

Patients do not need distance glasses anymore. If a multifocal Sulcoflex lens was implanted, they will be highly (and sometimes completely) independent from reading glasses.

Side effects without severity

The patient has to adapt to a well-defined focal distance (e.g. 45 cm) and needs a good light source when reading small prints.

Potential 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).

3.5 Techniques of implantation of a Corneal Inlay to correct presbyopia

A Near Vision Inlay is an innovative way **to correct presbyopia** in patients over 45 years of age who have a good distance vision and want to dispense with their reading spectacles. The central curvatures (asphericity) of the cornea are modified by the insertion of an inlay -a small pastille of 3.8 mm diameter and a thickness of 1 mm- at a depth of 150 microns in the cornea. This technique allows to **improve near vision and vision at intermediate distance** without too much affecting the quality of the distance vision. An inlay is only inserted in the dominated eye under a corneal flap made by a femtosecond laser. The dominant eye remains uncorrected and takes care of the distance vision.

The procedure aims at **significantly diminishing the need for reading glasses**. However in some cases patients will still need reading glasses in specific circumstances: for example to read small characters or to read for a longer period of time.

Indication

2 patient groups may benefit from the implantation of inlays:

Firstly

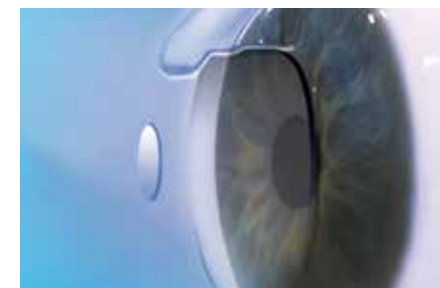
- Patients over 45 to 60 years of age who have a good uncorrected distance vision (emmetropia) and wish to dispense with their reading spectacles

Secondly

- Shortsighted or farsighted patients of 45 to 60 years of age who as a consequence of their age are also presbyopic. If their myopia or hyperopia is corrected by a femto-LASIK treatment they will still be left with the problem of their presbyopia.
- At the end of a femto-LASIK treatment an inlay can be inserted under the flap in the dominated eye to create a certain independence towards their reading glasses.

As the inlay is positioned at a depth of 150 μm in the cornea the following corrections are possible:

- Myopia from -1.5 to -6.0D (with or without astigmatism)
- Hyperopia from +1.0D to +3.0D (with or without astigmatism)



Surgery

The entire procedure takes about 10 minutes per eye. The procedure is not painful. A corneal flap is made by means of a femtosecond laser at a depth of 150 µm in the cornea. While cutting the flap, vision disappears for about 20 seconds. The inlay is centered on the visual axis. The surgeon then puts the flap back into place.

Results

Presbyopic patients will notice an improvement of their reading abilities while the quality of their distance vision will only be very slightly altered.

When combined with a LASIK treatment, hyperopic patients will notice an improvement of their reading abilities as well as their distance vision.

When combined with a LASIK treatment, myopic patients will notice an improvement of their distance vision but this slightly at the expense of their reading abilities, they might still need to wear reading glasses for example to read small characters.

Side effects without severity

- Photosensitivity and tearing during the 2 first days after the surgery
- Ocular dryness during 4 to 6 weeks after surgery
- Loss of contrast sensitivity immediately after surgery but this will restore after 3 to 6 months
- Sometimes complaints about a slightly diminished night vision

Possible complications

- There is no surgery without risks
- The procedure is reversible: if the patient is dissatisfied of the result, the inlay can be removed.

4. Dr J. C. Vryghem's profile

Dr Vryghem's ophthalmologic practice is mainly devoted to cataract and refractive surgery. He is especially interested in applying the latest surgical techniques and making them available to his patients. He has been head of the Ophthalmology Department of St-Jean Clinic in Brussels from 1996 to 2012. Since September 2012 he consults and operates in the Parc Léopold Clinic in Brussels. He is responsible for training residents on behalf of the Ophthalmology Department of the Universitaire Ziekenhuizen Leuven (Catholic University of Leuven).

He aims to contribute to the advances in technology and appears regularly in the programs of Belgian, European and American congresses. He is often invited to address scientific meetings as a guest speaker or moderator. He has already on several occasions been invited to demonstrate his surgical technique at conferences with live retransmission of surgeries for example in Berlin, Alicante, Moscow, etc.

At the national level he is Vice-President of the Belgian Society of Cataract and Refractive Surgery and has organized several scientific meetings and live surgery sessions. At international level he is the organizer of a worldwide expert meeting on the treatment of keratoconus (Current Surgical Options in the Management of Keratoconus). Since January 2014 he is Board Member of the European Society of Cataract and Refractive Surgeons (ESCRS).

Dr Vryghem has developed specialized skills for the re-treatment of patients who have been dissatisfied with the results of their initial refractive laser surgery.

Since 2006 he is a member of the editorial board of 'Cataract and Refractive Surgery Today – Europe'. Since 2012 he is member of the editorial Board of 'the International Journal of Keratoconus and Ectatic Corneal Diseases'.

Dr Vryghem's Eye Center was selected by different organizations as a reference center: WaveLight Betasite since May 2003 and Schwind International Reference Center since August 2011. These sites are selected thanks to their excellent reputation in the domain of refractive surgery out of refractive surgery centers throughout the world and are the first to have access to the latest technology.

Dr Vryghem is clinical investigator for Ziemer (femtosecond laser) and Physiol (multifocal intraocular lenses) and participates in several clinical studies.



ISO 9001: 2008 CERTIFIED

Brussels Eye Doctors is **ISO 9001:2000/2008 certified** since July 2006, after a thorough reorganization and after several audits executed by Lloyd's Register Quality Assurance. At Brussels Eye Doctors our hallmarks are the highest quality professional standards in a modern patient-oriented structure. Brussels Eye Doctors thus aim to ensure that all our patients are certain that they have received the best possible care in the best possible conditions.

Following an audit conducted in our center by an independent auditor of ISS Hygiene and Expertise on request of the Belgian Workgroup of Extramural Eye Surgery Brussels Eye Doctors has been certified on December 31, 2012 for a period of two years. Through this certification the RIZIV recognizes our operating room, processes and organization as an official **Extramural Eye Surgery Center**.

Our center was controlled on the basis of five different parameters, namely architecture, equipment, sterility, staff and responsibilities.

5. Dr Vryghem's team

Dr Jérôme Vryghem works in a team with six other colleague ophthalmologists: Hilde De Leener, M.D., Doris Cools, M.D., Kamelia Ilieva, M.D., Miriam Zelinka, M.D., Marianne Van Winden, M.D., Some of them master a sub-speciality within ophthalmology. Kathleen Leroux, M.D., plastic surgeon, is doing eye lid surgery.

Cristel Neese is the Office Manager.

Cindy Cassiman is the Junior Office Manager. Jolien Vandenbosch (optometrist), Kim Vong, Kelly Opsomer, Melanie Vanbellinghen, Doura Yahyaoui and Guénaëlle Beeckmans take care of the secretarial and organizational duties of the Practice. Florence Hertsens and Nele De Clercq are in charge of the surgical ward.



6. Practice Infrastructure

Brussels Eye Doctors' facilities include up-to-date infrastructure with two fully equipped surgical wards: a laser room and an operation room dedicated to intraocular surgery only. Throughout time Dr Vryghem has worked with the following excimer lasers: Lasersight (1995), Nidek EC 5000 (1996), WaveLight Alegretto 200 Hz (2003), WaveLight Eye-Q 400 Hz (2005), Schwind Amaris 750S 750 Hz (2011) and the following femtosecond lasers: Ziemer LDV (2006), Ziemer LDV CrystalLine (2011). Dr Vryghem has always elected to be the first to purchase the most modern and advanced equipment because he strives to make available the latest and most innovative technologies for his patients.

Brussels Eye Doctors was in 2006 the first ophthalmological practice in Belgium to purchase a Ziemer LDV, a **Femtosecond Laser** of the latest generation to perform Femto-LASIK treatments for the surgical correction of refractive errors in a safer and more predictable way. Since 2011 Dr Vryghem uses The Crystal Line Ziemer LDV which allows for the creation of the tissue flap in less than 20 seconds.

Since August 2011 Dr Vryghem is the first refractive surgeon in Belgium to use the Schwind Amaris 750S **excimer laser** for his refractive treatments at his practice. The Schwind Amaris laser is the most advanced and innovative excimer laser on the market, currently offering the most accuracy and reliability in the area of refractive eye surgery and outperforming all other excimer lasers.

The most important features of the Amaris 750 S are as follows:

- The Schwind Amaris 750 S excimer laser is currently the fastest excimer laser on the market. Its treatment frequency has been increased to 750 Hz.
- The 6-dimensional turbo eyetracker (1050 Hz) follows every movement of the eye via an infra-red high-speed camera tracking system with a frequency of 1050 images per second. As a result, all movements are recorded, including pupil and limbus tracking and rotation balance.
- The treatable optical zone is 10 mm, in comparison to only 8 mm for other excimer lasers. This reduces the risk of halos and other disturbing visual phenomena after laser treatment.



- The laser allows customized treatments: topography-guided (shape of the cornea) or wavefront-guided (aberrations) and takes the cyclotorsion (rotation of the eye in comparison to the visual axis of the eye when lying down) of the eye into account. This technique guarantees a better quality of night vision and a better contrast sensitivity.

The surgical ward is equipped with an **operation microscope** (Zeiss) and a **phaco-emulsification system** (AMO Signature with Ellipse handpieces with the latest White Star ICE/CASE software), which make it possible to perform phakic lens implantation, Refractive Lens Exchange, and cataract surgery. For the exact calculation of implant lens power we use **optical biometry** by means of the Zeiss IOL Master without touching the eye, which is more comfortable for the patient than classical echography in which a probe is applied to the cornea.

7. Location

Dr Vryghem's practice, is located near Montgomery Square, in the eastern part of Brussels and can easily be reached by public transportation: Montgomery Metro stop at 50 meters (Line 1), Tram Line 7,25,39,44. Bus Line 81 and 83.

The address is:

Boulevard Saint-Michel 12-16, 1150 Brussels (Woluwé-Saint-Pierre).

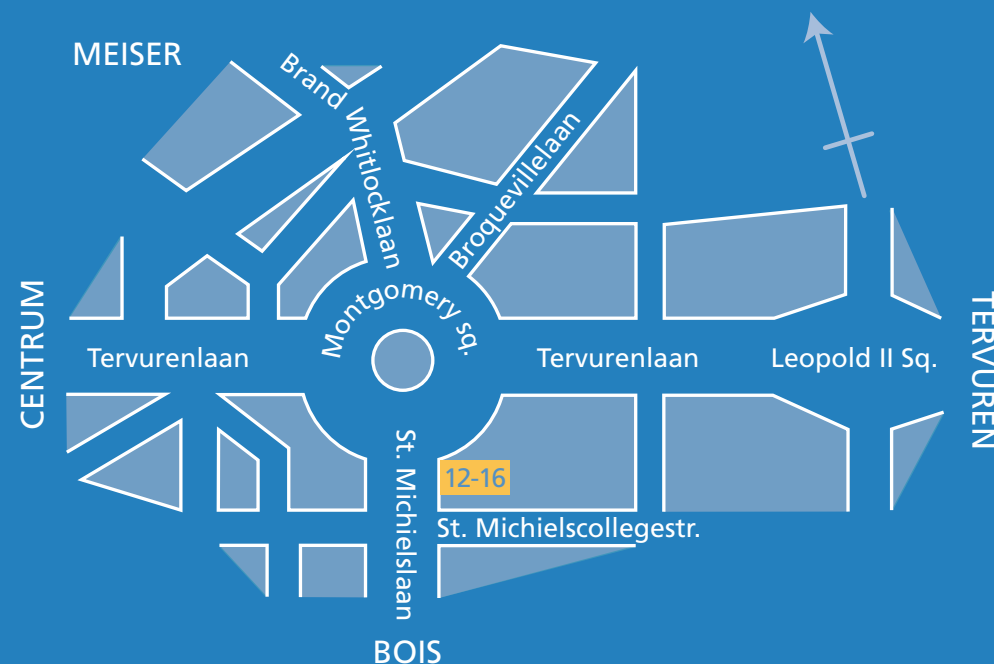
Appointments can be made by phone:

Tel: +32-2-741.69.99

Fax: +32-2-732.71.48

E-mail: info@vryghem.be

On our websites: www.vryghem.be and www.brusselseyedoctors.be you will find more information than is presented in this folder.





BRUSSELS
EYE DOCTORS

www.vryghem.be | www.brusselseyedoctors.be