



sjónlag
Eye Center

INTRODUCTION

A full third of the population needs glasses and contact lenses in order to see things in focus. This is caused by common conditions called myopia, hyperopia and astigmatism. The 20th century was the century of many inventions in medicine – this includes the invention of laser refractive surgery, which allowed millions of individuals to get rid of visual aids or at least decrease their use greatly.

Since 2001, the ophthalmologists of Sjonlag Eye Center have been performing laser refractive surgery in Iceland. Information contained in this booklet describes the preoperative examination needed in order to establish whether an individual is a candidate for laser refractive surgery. It also describes the operation itself, the possible complications and what can be expected following the procedure.



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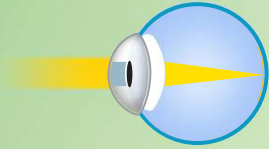
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THIS BOOKLET ALONE DOES NOT REPLACE A VISIT WITH OUR DOCTORS.

Our aim is that this booklet in addition to meeting our ophthalmologists gives you a foundation for making a well-informed decision on whether this operation is the right choice for you. We encourage you to ask all the questions you may have before the operation by asking the ophthalmologist or nurse directly.

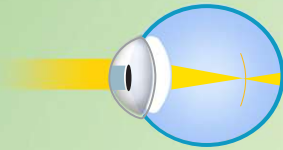
MYOPIA, HYPEROPIA AND ASTIGMATISM – WHAT DOES IT MEAN?

The cornea is a transparent dome in front of the eye and creates a part of the front “wall” of the eye. One of its roles is to help focus the light on the retina in the back of the eye. We want the things we see to be in sharp focus. In myopia (nearsightedness), hyperopia (farsightedness) and astigmatism the world appears out of focus. The aim of laser refractive surgery is to reshape the cornea with laser so that the picture becomes perfectly focused.



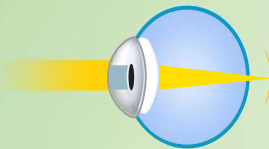
A NORMAL EYE

Here we see a normal eye, a ray of light falls on the eye and the focal point falls exactly on the retina at the back of the eye. The picture will be in focus.



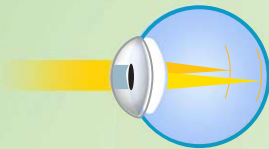
MYOPIA

The myopic eye is shaped like an egg instead of a table tennis ball, and because of this the focal point ends in front of the retina. The eye is simply too long. The picture will be out of focus. Nearsighted people can only see things that are very close to them.



HYPEROPIA

In contrast, the hyperopic eye is way too short and the focal point ends (hypothetically) behind the eye. As a result, the picture will be out of focus, both at far and even more so at near.



ASTIGMATISM

In astigmatism, the cornea becomes skewed, looking like an American football instead of a European one. A ray of light falls unevenly on the retina (different focal points) and the picture is out of focus.



Normal vision



Myopia



Hyperopia



Astigmatism

TREATMENT FOR REFRACTIVE DISORDERS, MYOPIA, HYPEROPIA AND ASTIGMATISM

Glasses are the most common device used to treat refractive disorders. A so-called concave lenses are used to treat myopia. The power of these lenses is measured in diopters, in this case with a minus in front of the number (for example, -4.0 diopters, or D). The higher the number is, the farther back the focal point ends in the long eyes of myopic patients. In case of hyperopia, a so-called convex lens is used to bring the focal point up front in order for it to land on the retina in the short eyes of hyperopic patients. Astigmatic lenses correct astigmatism, however, it is often difficult to treat high astigmatism with glasses, as the lenses need to be quite complex in shape in order to bring the object into clear focus – regardless of where the person is looking.

way of correcting refractive disorders. Many people feel that glasses are a nuisance and difficult in certain circumstances and activities. Of course, glasses are nothing but visual crutches and do not bring cure to those with refractive disorders.

Contact lenses treat myopia, hyperopia and some types of astigmatism. They are placed on the cornea in front of the eye and are separated from it only by a thin layer of tear fluid. If they are used in the right manner, they can be a good alternative for treating refractive errors. Certain problems can occur with their use, such as allergic reactions, infections and changes in the shape of the cornea. Contact lenses have in rare cases been associated with visual impairment and blindness due to corneal ulcers.



LASER REFRACTIVE SURGERY

Several types of laser refractive surgery are available today. LASIK (Laser-Assisted in Situ Keratomileusis) is by far the most common one. In several cases we use different types of treatment, such as PRK, PTK and LASEK. Usually we treat patients with a "simple" LASIK treatment, as most corneas have a normal dome shape which lends itself perfectly to this type of treatment. In several cases, however, we choose to use the recently developed custom treatment (also called fourth or sixth generation treatment), which is especially developed to treat irregular corneas, especially so-called irregular astigmatism. We only use the latest technology, including scanning laser technology, tracking system using the iris as a landmark, rotational tracking system as well as the custom laser treatment working with the latest NAVEX technology, now both for myopia and since December 2008, hyperopia.

EYE EXAMINATION BEFORE LASER REFRACTIVE SURGERY

- Medical history assessed with a detailed history of health and use of prescription medications.
- Refraction needs to have been stable for 1-2 years.
Also, each patient is asked about eye infections and previous eye trauma.
- Visual acuity is measured thoroughly several times, both with glasses as well as best corrective lenses.
- Intraocular pressure, pupil size, and corneal thickness are measured
- The surface of the cornea is mapped in detail using a special device – this is called corneal topography.
- The eyes are examined in great detail with a slit lamp.
- Retina and optic nerve including the retinal periphery are examined thoroughly after dilating the pupils with dilating drops.

THINGS TO REMEMBER

Following the eye examination it is difficult to read for 2-3 hours. Most people can drive home following the examination, however, it is possible that your vision will not allow driving. After the thorough eye examination, you will find out whether you are a possible candidate for laser refractive surgery. We emphasize that you understand completely that the operation is strictly for individuals who want to be less dependent upon glasses and contact lenses. Although most patients do not have to use glasses for far vision after surgery, the possibility still exists. We also emphasize that you only undergo surgery if you are fully aware of the risks involved. The lower age limit of the surgery is eighteen years. A full stability of refraction needs to have been achieved for 1-2 years.

For patients living out of the country, trip expenses for additional treatments, if needed, are not included in the price of the operation. However, the reoperation itself is free of charge. Also, examinations in other countries, will have to be covered by the patient himself, as well as making sure to get adequate follow-up at 2 weeks, 3 months and 6 months following surgery. The patient would, of course, be welcome to have the postoperative examinations performed at our eye center free of charge.

1. LASIK is not intended for those who have severe ocular inflammation, infections, severely dry eyes, corneal scarring, corneal dystrophies, autoimmune diseases, certain types of arthritis and severe diabetes. In addition, individuals using Roaccutane and Cordarone should not undergo laser refractive surgery.
2. Pregnant women should not undergo surgery until after childbirth and breastfeeding mothers should wait until 6 months of breastfeeding.

The LASIK procedure

Refractive procedures such as LASIK are aimed at changing the curvature or shape of the cornea.

This is a description of a typical LASIK procedure:

Make sure that ... :

- You don't wear soft contact lenses for at least 1 week before surgery
- You don't wear hard contact lenses for at least 2 weeks before surgery
- You wear warm clothing, as the temperature in the OR is not very high
- You don't wear eye make-up, perfume or after shave the morning of operation
- You tell us what your preference is regarding taking Valium (diazepam) before surgery. You don't have to take the medication and you can also request additional medication if needed.
- You don't drive until the doctor has allowed it (usually the day after surgery)



Anesthetic (numbing) drops are given at the beginning of the procedure. You should feel very little or no pain during the operation. Only one eye is treated at one time. We place a speculum to keep the eye open during the operation. You will be asked to look at a small red guiding light to keep your eye steadier. The head of the treatment laser will follow your eye with great precision so you don't need to worry about the laser going anywhere else than it's supposed to go. First, a so-called microkeratome is used to make an extremely thin flap (0.12 mm) on your eye. We then perform the laser treatment on the bed underneath the flap and then place the flap back in its place. This is usually over and done with within a minute. During the laser treatment, you will smell a slight burning smell, which is normal. We then wait for the flap to become adherent to the underlying surface, which will only take 1-2 minutes, then remove the speculum – the operation is over!

What can you expect after the operation?

Your vision is expected to improve greatly after the operation without the help of glasses and contact lenses. In a few cases (usually less than 2%), people need glasses after surgery to be able to see at great distances, usually however, the glasses are much weaker than the glasses used before. However, if you are more than 45 years of age, you should expect having to use reading glasses just like your peers – even though you were treated with partial monovision abilities. Most people find it more valuable to be free from glasses during sports and outside activities. This of course is different between individuals. Each and everyone must decide whether the operation is likely to bring you whatever you want from laser refractive surgery.

Your expectations are a vital part of the preoperative exam - don't hesitate to ask all questions necessary for you to make the decision.

This is your decision and yours alone.



The background of the page features a warm, golden sunset or sunrise. In the foreground, the silhouettes of several people are visible, some standing on a rocky outcrop or mountain peak, looking towards the bright sun. The overall atmosphere is serene and hopeful.

FOLLOWING THE OPERATION

Little or no discomfort is expected after LASIK surgery. A little itching and burning is allowed as well as a small degree of foreign body sensation, not unlike wearing old contact lenses. If the degree of discomfort is higher, you need to call our emergency number. Anti-inflammatory and antibiotic medications are used following the procedure, as described in a separate booklet following the operation. Certain types of activity are not allowed following the procedure and you have to sleep with a certain kind of goggles provided by us for four nights afterwards. The eye examinations after the surgery take place the day after surgery, two weeks, three months and six months later. These are very important and should be performed whether you are here in Iceland or elsewhere. Let us know immediately if anything comes up, either by calling our emergency number or by sending an e-mail.

We like to emphasize that although most people show extremely fast recovery following the operation and can read the text on TV that night, for some people it may take longer to experience final results.

Hyperopic patients take usually longer to recover than myopic patients and sometimes experience more pronounced visual fluctuations (vaseline vision) than myopic patients.

PRESBYOPIA

In our forties the presbyopia sets in – nobody is immune to it! Presbyopia is age-related because the lens inside the eye gets harder with age and the autofocusing ability of the eye consequently decreases. This leads to the need for reading glasses (readers) when focusing at near. Laser refractive surgery does not treat or prevent presbyopia. People will still need reading glasses following surgery. To decrease the need for reading glasses, we sometimes make the non-dominant eye (the eye you use less, for example the eye you close when you squint in bright sunlight) a little nearsighted. This is called monovision, which involves using the dominant eye at far, but preferring the non-dominant eye for reading or work up-close. This is a compromise, but, again, not a cure for presbyopia. Although most people will be able to use the non-dominant eye for reading larger letters, such as menus and letters on grocery products, everyone will sooner or later need to use reading glasses for fine print.

POSSIBLE COMPLICATIONS

No operation is without risks. This is similar to climbing a mountain. Your reward is to get to the top of the mountain, however, there are certain risks involved in getting to the top. The risk is very small, however, it is there and it cannot be predicted which individual will have which complications. None-the-less, the procedure is one of the safest eye operations known. Each individual must evaluate for him- or herself the pros and cons of laser refractive surgery and compare them to the pros and cons of the other alternatives for people with refractive errors, glasses and contact lenses. These latter alternatives are not risk-free, such as vision-threatening infections caused by contact lenses and ocular lacerations caused by broken glasses. No alternative is completely risk-free.

DRY EYES

All eyes become dry following laser refractive surgery. You need to use artificial tears for at least four weeks following the procedure and often longer. After six months, the tear production of the eye has usually reached its preoperative stage.

INFLAMMATION

Inflammatory reactions are normal after all surgical procedures. In some cases (1-5%) the inflammation needs to be treated with additional anti-inflammatory eye drops. This could affect visual acuity and in very rare cases the flap needs to be lifted and treated with anti-inflammatory eye drops. Almost all cases of inflammation are seen on the first day after surgery.

EPITHELIAL INGROWTH

Following LASIK the flap adheres to the underlying surface without the need of suturing. In a matter of few hours, the epithelium (outermost layer of the cornea) grows over the edges and closes the surgical wound. In rare cases (1-2%) the epithelial cells can grow under the flap and in very rarely continue to grow if measures are not taken. Very rarely, the flap needs to be lifted and the epithelial cells removed. This is usually very effective and the flap adheres very well to its underlying surface without any further ingrowth.

INFECTION

This is exceedingly rare, with a rate of 1/5 000 surgeries. This has not been described in this country as far as we know. In case of an infection, it can be treated with antibiotic drops.

REMAINING REFRACTIVE ERROR

In most cases the patient becomes less dependent upon glasses and contact lenses following the procedure. However, in some cases, a certain degree of hyperopia, myopia and astigmatism will remain. In approximately 5% of cases, the procedure requires a second step in order to fine-tune the result. Further treatments may be needed, although this is very rare. As with many of the complications, this is more common in individuals with a high degree of refractive error.

IRREGULAR CORNEAL/SURGICAL BED SURFACE

In almost all cases following the procedure, the surgical bed underneath the flap and the corneal surface are very even and regular. In very rare cases, irregularities of these surfaces may occur for reasons known (among those sudden movements during the procedure, epithelial sloughing, hidden corneal scars or foreign bodies) or unknown. These irregularities can cause decrease in visual acuity of 1-2 lines and occasionally double vision as well as haloes around lights and light streaks from light sources. The incidence of these complications has decreased very much in the last few years with increased technology. Irregular astigmatism can usually be treated effectively with custom laser treatment using fourth generation laser technology. This increases greatly the safety level for our patients, but fortunately it rarely needs to be used.

LIGHT SENSITIVITY AND GLARE

Slight glare following laser refractive surgery is common and should be expected in the first weeks. This has been called "vaseline vision". This is usually caused by slight edema (fluid collection) and fluid imbalances in the flap, which almost always decreases and disappears. In rare cases, these symptoms can last for few months following the procedure.

HALOES

Similarly, haloes can be noted around light sources, especially after dark. This is more noticeable when the pupil size increases and can occur if the treatment area is smaller than the area treated on the cornea. In most cases, however, this is due to slight edema in the flap, which usually disappears with time. It's very uncommon for these symptoms to interfere with daily life. If they appear and persist, it is more common in those with large pupils and/or a large amount of preoperative refractive error.

DECENTRATION OF TREATMENT AREA

In rare cases, the treatment area may be slightly displaced from the corneal center or, more accurately, the visual axis of the cornea. This is rarely due to eye movements of the patient, as our laser has very accurate tracking device following the eye movements (200Hz). However, in extremely rare cases, the treatment area may be decentrated, resulting in symptoms such as haloes, double vision and experiencing streaks emanating from light sources. In most cases, custom laser treatment can be used to treat the area.

OTHER COMPLICATIONS

As with all surgical procedures, there may be other complications following this surgery than those who are already mentioned, causing various symptoms not mentioned here. The most serious visual complication following an eye operation is blindness and the loss of an eye. Over 20 million laser refractive procedures have now been performed in the world. Blindness and loss of an eye have not been reported. In contrast, many reports of blindness and loss of an eye due to the use of contact lenses and glasses have been described. It would be interesting to learn the answer to the question: "How many people have died due to foggy glasses?"

Emergency numbers (GSM): 898 3288 (Dr. Kristinsson) 895 4441 (Dr. Bjornsson)

If these phone numbers cannot be reached, the hotline for the Eye Department at the University Hospital (Landspítali) is: 543 1000

SJÓNLAG

Sjonlag Eye Center is a leading refractive surgery center in Iceland. Established in 2001, thousands of procedures have been successfully performed by skilled surgeons educated at the finest ophthalmology institutions in the US, Norway and Sweden.

Our primary values include caring for our patient, quality of our education, service and competence, showing empathy and respect for every individual and to aim towards technical excellence in our work.

Sjonlag Eye Center offers you the opportunity to safely become less dependent on the visual aids of glasses and contact lenses.



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