



What you should know about Laser Blended Vision

A personalized treatment for patients with presbyopia



Seeing beyond





Optimized visual acuity at all distances for patients with presbyopia

Laser Blended Vision

Our eyesight is the most valuable of all our senses. We take in the world around us primarily with our eyes. Seeing provides us with information, puts things into perspective and forms our views.

As we grow older, bodily functions like our eyesight start to decline. Presbyopia is a common eye condition that affects many people over the age of 40. Thereby, the eye starts to lose its ability to shift focus, causing difficulty when focusing on close objects and blurriness when reading. However, thanks to pioneering medical and technological research in recent years, correction options are available.

One of these options is Laser Blended Vision, an advanced Laser Vision Correction for compensating some of the symptoms of presbyopia. It offers several advantages over conventional methods, particularly with respect to the customization of treatment, vision in focus at all distances and the immediate impact it provides.

Whether Laser Vision Correction is right for you depends on a variety of factors. Your eye doctor will be happy to assist you in finding the best option for your vision needs.

Bringing it into focus

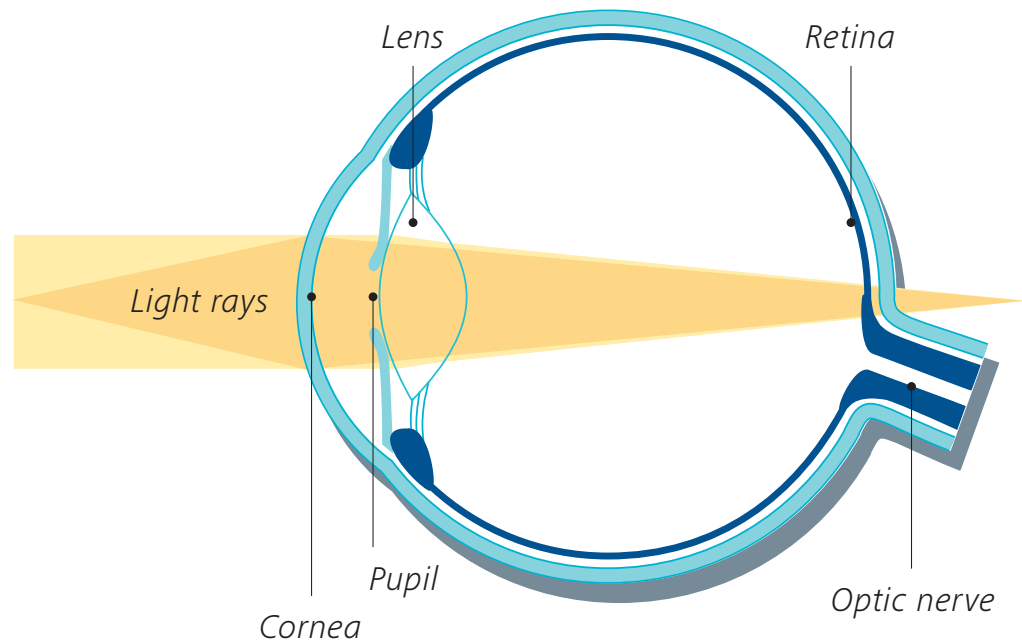
Understanding presbyopia

Presbyopia is the natural regression of vision with age that usually begins at the age of 40 and older. Similar to a camera lens, the cornea and lens of the human eye bundle the light rays and focus them at a focal point on the retina, resulting in a sharp image that is transmitted to the brain. The lens of the eye can change shape to focus on objects

at different distances. As we age, the lens becomes less flexible and starts losing its ability to change shape and to adjust its focus. As a result, we have difficulty seeing sharply at all distances and eventually require reading glasses or contact lenses.

Presbyopia

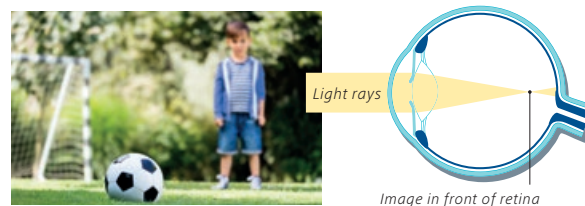
Through the increasing inflexibility of the lens and other biomechanical changes within the eye, the light rays from close objects cannot be focused on the focal point of the retina. As a result, objects at a short distance appear out of focus.



Presbyopia can occur in conjunction with other refractive errors such as nearsightedness, farsightedness, astigmatism and even normal vision. Fortunately, there is variety of methods that can help people with presbyopia to achieve vision in focus at all distances. Learn more about some of the Laser Vision Correction options on the following pages.

Nearsightedness (myopia)

Light rays are refracted by the cornea and the lens in such a way that the focal point is in front of the retina. Distant objects appear out of focus. Depending on the degree of myopia, near objects appear in sharp focus.



Farsightedness (hyperopia)

Light rays are refracted by the cornea and the lens in such a way that the focal point is behind the retina. Depending on the extent of hyperopia, objects that are close, and even distant ones in some cases, appear out of focus.



Astigmatism

The irregular curvature of the cornea causes the light rays to be refracted into multiple focal points and not just one. Depending on the extent of the astigmatism, objects both near and far appear skewed and distorted.

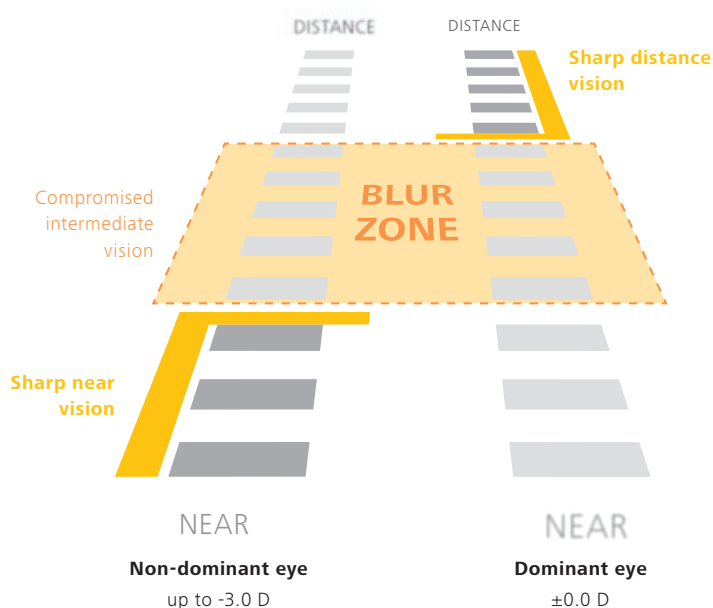


Comparing Laser Vision Correction options

Monovision

Most conventional treatment methods – surgical treatments as well as contact lenses – use the principle of monovision: one eye is corrected for distance and the other eye for near vision. The brain must adjust to seeing two images corrected for different distances. Unfortunately, a number of patients are unable to get used to the procedure.

According to scientific studies, only about 59–67 %¹ of them can successfully merge the two images. Patients frequently experience an area of compromised vision in the intermediate range – the Blur Zone. Those patients that are able to tolerate the procedure often require some time to adjust to their new eyesight.



References

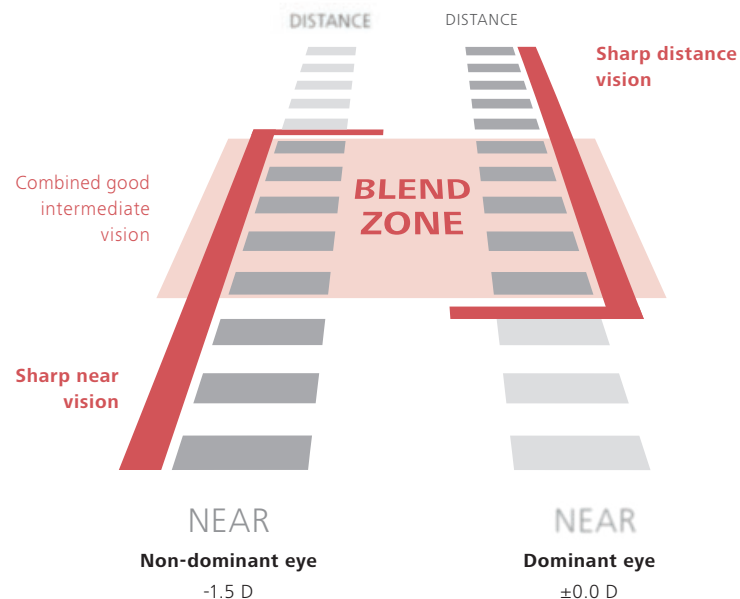
- 1 Bruce J.W. Evans, Ophthalmic and Physiological Optics, Vol. 27, Issue 5, September 2007, pages 417–439
- 2 Dan Z. Reinstein, Journal of Refractive Surgery, Vol. 27, Issue 1, January 2011, pages 23–37

Laser Blended Vision

By comparison, Laser Blended Vision offers a variety of extra advantages – specifically, customized treatments that result in vision in focus at all distances. Laser Blended Vision represents the next stage in eye care excellence. Similar to monovision methods, one eye is primarily corrected for distance vision, while the other eye is corrected for near vision. However, there is a significant difference: it uses your binocular vision by fine-tuning the depth of field of each eye individually, creating a customized fusion of the two images in the intermediate zone – the Blend Zone.

The unique Blend Zone makes it easier for the brain to maintain its binocular vision by merging the images of both eyes for your normal 3D vision. Most patients experience an immediate

improvement. They are able to adapt faster to their new eyesight. In addition, the procedure is tolerated by the vast majority of patients – up to 97 %² as compared to only 59 – 67 %¹ for monovision. Another huge advantage of Laser Blended Vision is that it maintains contrast sensitivity and preserves stereo-acuity very well.



Finding the right option

Is Laser Blended Vision right for you?

Laser Blended Vision is especially well suited for people with a very busy and active lifestyle who often find that reading glasses are not convenient enough.

Laser Blended Vision is effective for treating patients with presbyopia who also have other refractive errors like myopia, hyperopia or/and astigmatism.

In order to find out if Laser Vision Correction is right for you, your personal vision requirements and expectations are important factors. That is why you will have to answer questions about your hobbies, your daily activities and other aspects that might affect the decision.

As Laser Blended Vision is customized for each patient, you will also have to undergo a detailed eye examination. The nature and degree of your refractive error(s), curvature and thickness of the cornea, as well as many other factors play a role. Your tolerance level for monovision and ocular dominance will also be tested.

Your eye doctor will then personally advise you as to whether a treatment with Laser Blended Vision is right for you.



Performing Laser Blended Vision

The treatment steps

Laser Blended Vision at a glance

- Age-optimized Laser Vision Correction for people with presbyopia
- Based on an established LASIK treatment
- True binocular vision thanks to the unique Blend Zone
- Generally vision in focus at all distances: near, far and even intermediate
- Customized approach – individual treatment profile for each patient

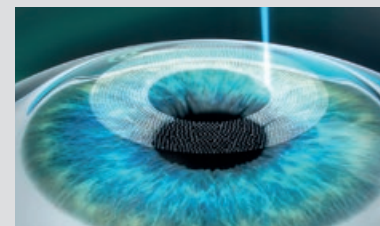
Prior to the treatment

Anesthetic eye drops are applied to the eye to ensure that the surgery is painless. An eyelid holder prevents the eye from blinking during surgery.

STEP 1

Creating the flap

A flap, a hinged corneal tissue, is created with a fast and highly precise femto-second laser.



STEP 2

Relocating the patient

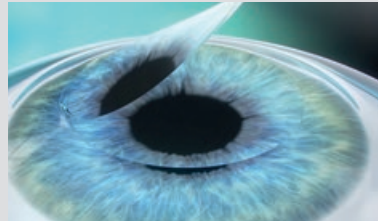
After the flap is created with a femtosecond laser, the patient is conveniently moved from the femtosecond laser to the excimer laser.



STEP 3

Folding back the flap

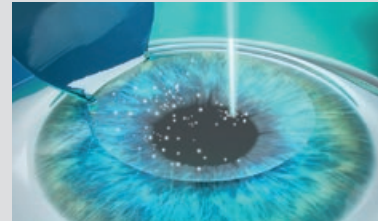
The flap is gently folded back, exposing the inner corneal tissue to be treated.



STEP 4

Correcting the vision

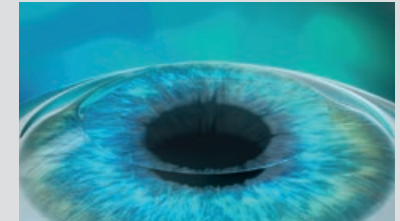
An excimer laser shapes the corneal tissue, correcting the dominant eye for distant vision and the non-dominant eye for near vision.



STEP 5

Repositioning the flap

Afterwards, the flap is returned to its original position, protecting the eye much like a natural bandage.



Getting to know further options

Overview of solutions for patients with presbyopia

Besides Laser Vision Correction, there are other options for compensating presbyopia. Especially when you first notice symptoms like having to hold reading materials at arm's length, the following non-surgical solutions can be a valid choice.

Glasses

- **Reading glasses** are usually one of the first options patients with presbyopia consider. They are especially suited for people with normal vision who never had to wear glasses or contact lenses before. Reading glasses can help correct close-up vision problems and are typically worn only during activities such as reading, sewing and other tasks that require near vision.
- **Glasses with bifocal lenses** have two different points of focus: one for distance vision and one for near vision. They are an option for nearsighted or farsighted patients who already have to wear glasses.
- **Glasses with progressive lenses** are similar to bifocal lenses, but offer a more gradual transition between near and distance vision.

For many people, wearing glasses may be a satisfactory option. However, many wearers find that their dependence on glasses interferes with their daily lifestyle.

Contact lenses

- **Multifocal contact lenses** can have a bifocal design with two distinct lens powers – one for your distance vision and one for near. Others have a multifocal design that is similar to eyeglasses with progressive lenses.
- **Monovision contact lenses** correct one eye for distance vision and the other for near vision. You need to adapt to monovision lenses and train your brain to see this way.

Contact lenses may have some benefits over glasses, but wearing contact lenses needs a lot of care and some patients do not tolerate wearing contact lenses well.



Surgical options

- **Intra-ocular lenses (IOL)** are an option for patients who need cataract surgery: the lens of the eye is replaced with an artificial lens that can also potentially correct symptoms of presbyopia.
- **Intracorneal inlays** are a surgical option where an artificial lens or diaphragm is implanted into the cornea. It improves near vision of the non-dominant eye for reading and other near-distance tasks. The procedure changes optical properties of the cornea and does not remove any corneal tissue.

Less invasive Laser Vision Correction methods can compensate the symptoms of presbyopia and correct refractive errors at the same time.

- **Monovision** corrects one eye for distance vision and the other eye for near vision. The brain must adapt to seeing two images corrected for different distances.
- **Laser Blended Vision** also corrects one eye primarily for distance vision, while the other eye is corrected for near vision. But there is a significant difference to monovision: it maintains your binocular vision by fine-tuning the depth of field of each eye individually, creating a customized fusion of the two images in the intermediate zone – the Blend Zone. The Blend Zone not only helps with faster adaptation, but it also gives you the ability to see in sharp focus in the intermediate distance.

Talk to your eye doctor to find out which option is best for your individual needs.

Further interesting facts

Answers to frequently asked questions

Laser Blended Vision is special.

Why?

With Laser Blended Vision, the treatment is customized for each eye. Thereby, an overlapping zone (Blend Zone) in the intermediate range is created. It makes it easy for the two eyes to merge the images for normal binocular vision and enables vision in focus at all distances.

How much experience has gone into developing the treatment?

ZEISS has stood for quality and precision in optics since 1846. It has over 100 years of experience in eye care. In 1986, the company unveiled the first excimer laser for correcting refractive errors of the eye. It has been at the forefront of advances in laser treatments to correct vision defects for over 25 years. Laser Blended Vision has been used to treat patients with presbyopia since 2009.

How do I know if it is suitable for me?

Treatment eligibility is the same as for normal LASIK, except that the therapy is customized for each patient with presbyopia. You will first have to undergo a detailed eye examination. The nature and degree of the refractive error, curvature and thickness of the cornea, as well as many other factors play a role. Your tolerance level for monovision and ocular dominance will also be tested. Your ophthalmologist will then personally advise you as to whether Laser Blended Vision is right for you.

How long will it take before I can see properly and can return to my normal routine?

Every healing process is different. In most cases, visual sharpness is already very good one or two days after the surgery. Your new vision normally stabilizes within two to three weeks.

Will I be able to see clearly at all distances with each eye?

With Laser Blended Vision, one eye is corrected for full distance vision and some mid-range vision, and the other eye is corrected to focus at the mid and near range. As a result, you won't be able to see sharply at all distances if you use just one eye. With both of your eyes, however, you will achieve vision in focus at all distances.

What is the time interval between surgery for each eye?

Usually, both eyes are treated the same day. That way, patients can fully experience the benefits.

What follow-up examinations may be necessary?

After surgery, you will be given drops and/or other medication. Your first check-up is usually the day after the surgery. Further examinations are generally conducted at regular intervals for the following weeks until your new vision has stabilized.

What are the risks?

As with all medical techniques and procedures, Laser Blended Vision is not without side effects. Only your physician can explain the individual risks and possible side effects to you and decide whether Laser Blended Vision is the right treatment option for you.





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