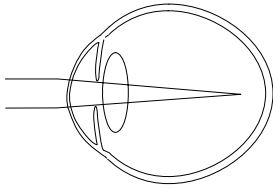


LASIK for myopia

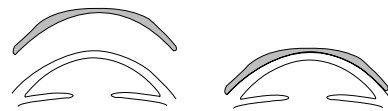
What is myopia?



Many people suffer from varying degrees of myopia, or short-sight, and sometimes also have astigmatism. Myopia is generally a result of the eyeball being fractionally too long to allow light rays to be focussed correctly at the back of the eye, whilst astigmatism is an optical defect created when the shape of the cornea is not perfectly round. The cornea is the major optical surface of the eye and any small distortion of its shape will blur the image on the retina at the back of the eye.

Contact lenses

A soft contact lens can bring the retinal image back into focus by creating an artificial surface of a different curvature to the cornea. To correct short sightedness the surface of the contact lens must be flatter than that of the cornea which it is sitting on. If astigmatism is also present, the soft contact lens needs to be of a more complex curve.



LASIK Surgery

LASIK is a recently developed operation which can correct both short and long sightedness and also astigmatism. An excimer laser is used to sculpt the cornea to a new curvature that will correct the optical defect.

LASIK surgery is carried out with a local anaesthetic (eye drops). A small metal suction ring is placed on the surface of the eye around the cornea. This stabilises a cutting device (microkeratome) that shaves 160 microns of tissue from the surface of the cornea to create a very thin flap. The microkeratome and metal suction ring are then removed from the eye and the tissue flap is temporarily folded to one side. The exposed area of cornea is sculpted by an excimer laser and flattened centrally. The laser treatment takes 1 or 2 minutes to complete, after which the flap of corneal tissue is folded back and the eye is protected by a plastic shield.



Photo-refractive Keratectomy (PRK)

PRK was one of the first methods of treatment introduced using the excimer laser to correct myopia. In PRK treatment, the thin layer of cells (epithelium) that covers the surface of the cornea is gently scrubbed off by the surgeon and the laser treatment is applied directly onto the surface of the cornea. At the end of the operation the normal covering of epithelial cells is missing from the treated area, and it is necessary for the surrounding cells to grow back over the central part of the cornea. Following PRK the eye is very painful for the first day or two. Although the cells will cover the central area in a few days, it takes several months for the cell layer to stabilise over the treated area, and there is often a degree of haze or scarring of the cornea in the treated area.

Advantages of LASIK

LASIK is a modification of PRK in which a tissue flap covers the laser-treated area. There is no raw area of cornea exposed at the end of the operation, and so little or no pain after the surgery, and the eye settles down much more quickly. The optical recovery is faster and the vision generally stabilises rapidly. It is rare to encounter scarring in the visual axis after LASIK.

Disadvantages of LASIK

LASIK surgery is technically more complex compared to PRK and requires additional instrumentation. This makes the procedure more expensive, and there is the additional risk of flap related complications.

Problems with Refractive Surgery

The amount of corneal tissue that can safely be removed by the laser is limited by the thickness of the cornea. To minimise the amount of tissue that needs to be removed by the laser, the optical correction is restricted to a small central area of the cornea. It can be seen from the diagram that the optically corrected area is generally smaller than that achieved by a contact lens. Provided that the treated area is directly over the pupil then the optical performance of the eye is satisfactory. If the pupil is very large (e.g. when driving at night) then the light rays may pass through both optically corrected and uncorrected parts of the cornea and this can lead to glare and poor vision. If the optical area treated is not perfectly centred on the pupil the quality of vision may also be reduced. If the strength of the optical correction achieved by the treatment is inaccurate, it is generally possible to carry out further treatment by lifting the flap and applying additional laser to the bed. A small optical correction requires less laser treatment than a larger correction. The greater the refractive error that is being corrected the greater the chance of a less than perfect outcome.

Presbyopia. As one gets older the ability of the lens of the eye to focus on close objects declines. Around the age of 40, most people who have not previously needed spectacles find that they require reading glasses. Similarly someone in this age group whose myopia is successfully corrected so that their distance vision is perfect, will then require reading glasses.

Progression of myopia. In the long term, regardless of whether LASIK surgery is carried out or not, it is possible that the underlying myopic condition may progress. Thus even if the myopia is initially fully corrected, over the years, although the corneal condition may remain stable, the eye may become myopic again to some extent due to further increase in the length of the eyeball. Some patients with high myopia are in the long run at an increased risk of developing other eye problems associated with myopia, such as cataracts, glaucoma, and retinal degeneration. It is unlikely that LASIK treatment influences the risk of these conditions occurring.