

Refractive errors

The most important refractive errors treatable by refractive laser surgery are: myopia, hyperopia and astigmatism.

Myopia is defined as a farsightedness refractive error. Global studies show that at present about 25% of the population suffers from myopia. Under these conditions, myopia is the most common cause of visual disturbances among people up to 40 years of age. The trend is that of a rapid increase in myopia prevalence (research suggesting that global prevalence of myopia will reach 40% -50% by 2050). In most cases, myopia is caused by an elongation of the eyeball. In these situations, the factors are primarily genetic. In other cases, myopia occurs as a result of exposure to harmful factors from the external environment. Activities such as reading in poor light conditions or prolonged computer work may cause myopia. Another cause of myopia can be the modification of the refractive indices specific to the transparent media within the eyeball. Modification of refractive indices may be due to the presence of other pathologies such as diabetes, cataract or corneal dystrophy. In diabetic patients, during hyperglycemia, excess glucose will result in a hydration of the lens and, in this way, an increased refractive index. This transient myopia disappears after glycemic normalization. Transient myopia may also occur during pregnancy. A lower percentage of myopia cases is the effect of pathologies such as retinopathy of prematurity, Fabry disease, Stargardt disease. The treatment of myopia consists in optical correction with concave lenses (eyeglasses or contact lenses) or refractive surgery.

Hyperopia is a farsightedness refractive error. In these cases, people can see distant objects, but have difficulty focusing. Patients with hyperopia accuse ocular fatigue, headache, sleepiness, and blurred vision towards the end of the day. In cases of moderate and severe hyperopia, amblyopia and/or strabismus may be associated. Amblyopia is defined as "lazy eye syndrome" and is installed due to the uncorrected refractive error. Strabismus (or eyeball deviation) is convergent (one of the eyeballs is directed to the nose) in most cases of hyperopia.

Periodic examination of hyperopic children is essential to avoid amblyopia and strabismus. The treatment of hyperopia consists in optical correction with convergent (convex) lenses. Hyperopic patients may use contact lenses or undergo refractive surgery.

Astigmatism is defined as an aspherical refractive error in which light rays from more than 5-6 m will focus on a focal line (regular astigmatism) or in irregular shape (irregular astigmatism). Regular astigmatism may have corneal or retinal causes. In cases of regular corneal astigmatism, corneal topography reveals surface changes. In some pathological conditions such as chalazion (eyelid inflammatory lesion) or palpebral tumors, secondary astigmatism can be observed, which disappears with the removal of the compressive form. Astigmatism of crystalline origin may be diagnosed in cases of subluxation of the lens secondary to ocular trauma. Surgical removal of the lens and its replacement with an artificial lens will treat the astigmatism. Retinal astigmatism is found in cases of malignant myopia where dilated areas are located in the posterior part of the eyeball (posterior staphyloma).