

Glossary of Terms

20/20 vision

Many eye care practitioners consider this the average visual acuity for human beings, but humans can see as well as 20/15 or even 20/10. People with 20/40 vision can see clearly at 20 feet what people with 20/20 vision can see clearly at 40 feet. In most of the United States, 20/40 is the lowest uncorrected acuity required for a driver's license.

A

Aberrometer

A computerized instrument that projects uniform light waves into the eye to measure both refractive errors and higher-order aberrations. These rays reflect off the retina and the returning "wavefront" of light is analyzed.

Ablate, ablation

To remove tissue during surgery, often with a laser.

Accommodation

The ability of the eye's natural lens to change shape so it can focus on objects at various distances.

Accommodative lens

A type of intraocular lens (artificial lens implanted in the eye in place of or in front of the natural lens to improve focus and correct vision problems). Has a fixed focal point, but physically changes shape inside the eye in response to eye muscle movements to adjust for clear vision at near, intermediate or far distances.

Anesthetic

Medicine that causes a loss of sensation including loss of pain. Local anesthetic causes numbness and pain relief in a localized area, such as the eye, without affecting the senses in the rest of the body.

Astigmatism

Common vision problem and type of refractive error. Caused by either irregularity in the curvature of the cornea or the lens of the eye. People with astigmatism generally have difficulty seeing fine details at all distances. Treated with corrective lenses, laser vision correction or toric IOLs.

B

Best Corrected Visual Acuity (BCVA)

The best vision you can achieve with correction, such as glasses, as measured on the standard Snellen eye chart. For example, if your uncorrected eyesight is 20/200, but you can see 20/20 with glasses, your BCVA is 20/20.

Best Uncorrected Visual Acuity (BUCVA)

The best vision you can achieve without correction, such as glasses, as measured on the standard Snellen eye chart. For example, if your uncorrected eyesight is 20/200 without your glasses then your BUCVA is 20/200.

Bifocals

Eyeglasses that combine two lenses made for focusing at different distances. Typically the upper lens provides clear distance vision and the lower lens clear close vision for reading and seeing fine details.

C

Cataract

Clouding of the eye's lens that blocks passage of light to the retina, resulting in impaired vision. Often a result of normal aging, cataracts form when protein clumps cloud areas of the eye's lens. As the cataract progresses, vision worsens and often requires surgical replacement of the damaged lens with an artificial one.

Cornea

Clear, curved surface at the front of the eye through which light enters the eye. Along with the sclera (the white part of the eye), provides external protection for the eye. Often called the window of the eye. During many types of vision correction surgery, such as LASIK, the cornea is reshaped to reduce or eliminate the main types of refractive error — nearsightedness, farsightedness and astigmatism.

Corneal flap

Thin slice of tissue on the surface of the cornea made at the beginning of LASIK surgery. Made with either a microkeratome or a femtosecond laser. The flap is folded back before the LASIK procedure can shape the inner layers of the cornea.

Corneal topography

A corneal topographer shines light onto the surface of the eye and then measures the reflected light to create a map of the cornea's curvature as well as any irregularities. The map is used for evaluations related to refractive surgery, contact lens fitting and corneal disease management. It is especially useful for measuring astigmatism. The color map uses blue and green to represent flatter areas of the cornea, while red and orange represent steeper areas.

Corticosteroids

Class of steroid hormones used to treat a variety of inflammatory conditions. Chronic use may lead to formation of posterior subcapsular cataracts.

D

Dilated

Made wider or larger. In eye health, usually refers to the pupil (the hole in the center of the iris that opens and narrows in response to light levels). During an eye examination and certain types of eye surgery, drops will be used to dilate or open the pupil.

Diopters

A measurement of refractive error. Hyperopia, or farsightedness, is measured in terms of positive diopters (+1, +2). Myopia, or nearsightedness, is measured in terms of negative diopters (-1, -2). Most refractive errors fall somewhere between +6 to -6 diopters.

Double vision

Also called diplopia. When two images of the same object are perceived by one or both eyes.

Dry eye

A syndrome characterized by corneal dryness due to deficient tear production. Often related to hormonal changes, local atmospheric conditions and many other causes. Approximately 42 million Americans experience this condition.

E

Ectasia

Progressive thinning and bulging of the cornea.

Endothelium

The cornea's inner layer of cells.

Epithelial ingrowth

A complication of LASIK in which epithelial cells (cellular tissue that covers the outside of body surfaces, including the outside of the cornea) grow underneath the corneal flap.

Epithelium or epithelial layer

Cellular tissue that covers the outside of body surfaces, including the outside of the cornea (the clear outer covering of the eye).

Excimer laser

Type of “cold” laser that emits ultraviolet light. Used in refractive surgery to remove corneal tissue and reshape the corneal surface.

F

Farsighted, farsightedness (hyperopia)

Common vision problem and type of refractive error. Caused by too little curvature of the cornea or too little distance between the front of the eye and the retina at the back. Both structural defects cause light entering the eye to focus incorrectly on the retina, resulting in blurred close-up vision. Treated with corrective lenses, laser vision correction or multifocal or accommodative IOLs.

Femtosecond laser

A precision laser used in “all-laser” or “bladeless” LASIK to create the corneal flap.

G

Glare

A higher-order aberration that typically occurs naturally. Glare gives the appearance of additional luster around lights which can interfere with vision, especially night vision. Glare can be a side effect of LASIK surgery and often decreases with time. May also be caused by cataracts or other eye conditions.

H

Halos

A higher-order aberration that typically occurs naturally. Halos give the appearance of rings around lights at night. Can occur as a side effect of LASIK surgery and often decreases with time. May also be caused by cataracts or other eye conditions.

Higher order aberrations

More complex irregularities of the eye that can cause vision problems such as difficulty seeing at night, glare, halos, starbursts or double vision. Some small degree of higher order aberrations are normal and do not usually cause noticeable vision problems. All eyes have at least some degree of higher-order aberrations including difficulty seeing at night, glare, halos, blurring, starburst patterns or double vision. With the introduction of wavefront technology, higher order aberrations can now be measured and addressed by vision correction options including high definition corrective lenses and laser vision correction procedures.

Hyperopia

Also called farsightedness. Condition in which the length of the eye is too short, causing light rays to focus behind the retina rather than on it, resulting in blurred near vision. Additional symptoms include eyestrain and squinting.

I

Idiopathic

Having an unknown cause. A medical condition that appears suddenly with no apparent explanation is considered idiopathic.

Informed consent

In the United States, medical providers must provide patients with information on the treatment, test or procedure in question. This information generally includes the expected risks and benefits as well as the likelihood of the risks and benefits occurring and is provided so that the patient clearly understands the matter. Patients should be given the opportunity to review this information and ask any questions in order to make the choice to undergo the treatment, test or procedure or not. In elective (patient-selected) procedures, the patient must voluntarily grant consent before the treatment, test or procedure is performed.

Intraocular pressure

Pressure within the eye caused by the tension between the fluid inside the eye and the eye itself.

Intraocular lens (IOL)

Artificial lens made of plastic, silicone or acrylic. Designed to be implanted in the eye in place of or in front of the natural lens to improve focus and correct vision problems, such as cataracts and presbyopia.

Iris

Colored membrane in front of the eye's lens that manipulates the size of the pupil and thus regulates the amount of light entering the eye.

K

Keratoconus

Degenerative eye disorder in which structural changes within the cornea cause it to thin and change to a more conical shape than its normal gradual curve. Can cause substantial distortion of vision, including multiple images, streaking and sensitivity to light. Typically diagnosed during adolescence and is most severe by the patient's 20s and 30s. If afflicting both eyes, deterioration in vision can affect the patient's ability to drive a car or read normal print.

Keratomeleusis

Reshaping of the cornea that was done with a lathe and blade before the development of LASIK techniques.

Keratoconjunctivitis Sicca

Also called dry eye syndrome. Chronic lack of sufficient lubrication and moisture in the eye.

Keratometer

An instrument that measures the curvature of the eye's clear, front surface (cornea). Keratometers help eye doctors collect information for contact lens fittings and surgical procedures. With keratometry, reflected images also can help identify dry eyes.

Keratoplasty

Any of several types of corneal surgeries, such as shrinking the collagen to reduce farsightedness or transplanting a new cornea to treat keratoconus.

Keratotomy

Incision of the cornea.

L

Laser vision correction

A class of surgeries where a laser is used to reshape the cornea to correct refractive errors. LASIK and PRK are types of laser vision correction.

LASIK (laser in-situ keratomileusis) surgery

Type of laser surgery in which the cornea is reshaped to improve vision. Either a microkeratome or a femtosecond laser is used to surgically create a thin, hinged flap of corneal tissue. The flap is folded back and an excimer laser is directed to the corneal surface exposed beneath the flap to reshape the cornea for corrected vision. Then, the flap is brought back into place.

Lens

The transparent disc behind the pupil that brings light into focus on the retina. As the eye ages, the lens often becomes cloudy and is called a cataract.

Low vision

Also called partial sight. Sight that cannot be satisfactorily corrected with glasses, contacts or surgery. Low vision usually results from an eye disease such as glaucoma or macular degeneration.

Lower order (first-order) aberrations

Aberrations are deviations from normal vision, such as blurring in an image. Lower, or first, order aberrations include farsightedness, nearsightedness, presbyopia and astigmatism. These make up the majority of human eye's vision imperfections. First-order aberrations are identified by vision tests including refractive and wavefront measurement instruments.

M

Macula

Part of the eye near the middle of the retina; the macula allows us to see objects with great detail.

Microkeratome

Precision surgical instrument used to create the corneal flap in the uppermost layer of the cornea during LASIK.

Monofocal (or “standard”) intraocular lens

Type of intraocular lens (artificial lens implanted in the eye in place of or in front of the natural lens to improve focus and correct vision problems) designed to provide clear vision at one fixed focal point; usually for clear distance vision.

Multifocal intraocular lens

Type of intraocular lens (artificial lens implanted in the eye in place of or in front of the natural lens to improve focus and correct vision problems) designed to include corrections for near, intermediate and distance vision in the same lens.

Mixed astigmatism

Abnormal curvature of the eye's surface (cornea) that causes focusing problems at both near and distant ranges.

Multifocal

Type of spectacle lens, intraocular lens (IOL) or contact lens design that includes more than one area through which the eye focuses. Examples are bifocals or trifocals. This enables sight at multiple distances, typically for people with presbyopia.

Myopia

Also called nearsightedness. Condition in which the length of the eye is too long, causing light rays to focus in front of the retina rather than on it, resulting in blurred distance vision. Additional symptoms include eyestrain, poor night vision and squinting.

N

Nearsighted, nearsightedness (myopia)

Common vision problem and type of refractive error. Caused by either too much curvature of the cornea or too much distance between the front of the eye and the retina at the back. Both structural defects cause light entering the eye to focus incorrectly on the retina, resulting in blurred distance vision. Treated with corrective lenses, laser vision correction or multifocal or accommodative IOLs.

O

Ophthalmologist

Doctor of medicine (M.D.) or doctor of osteopathy (D.O.) who is qualified to diagnose, manage and treat all eye and visual system disorders. An ophthalmologist is trained to render total eye care, including vision services, contact lenses, eye examinations, medical eye care and surgical eye care.

Optometrist

Eye health professional trained to provide primary eye care services, such as basic eye health and vision examinations, diagnosis of vision problems and eye diseases and prescriptions for eyeglasses, contact lenses and medications.

P

Presbyopia

Also called age-related focus dysfunction. Common vision problem that develops naturally over time. Characterized by loss of the eye's ability to focus at close distances or on fine details. Treated with reading glasses, contact lenses, presbyopia vision correction or presbyopia lens replacement surgery.

Pupil

The black, circular area in the center of the iris (the colored part of the eye) that regulates the amount of light entering the eye by constricting and dilating.

R

Refraction

The test performed during an eye exam to determine the eyeglass lens powers needed for optimum visual acuity. An automated refraction uses an instrument that does not require the patient to respond. A manifest refraction is the manual way to determine the best lenses by placing various lenses in front of the patient's eyes and asking, "Which is better, lens A or lens B?"

Refractive error

Irregularities in the cornea, lens or shape of the eye that prevent correct focus at any distance.

Refractive surgery

Any surgical procedure that attempts to decrease the patient's refractive error (irregularities in the eye that prevent correct focus). LASIK surgery is a common type of refractive surgery, as is lens replacement.

Retina

Transmitter at the back of the eye that contains blood vessels and nerves and sends images to your brain through the optic nerves.

Retreatment (LASIK enhancement)

Additional LASIK treatment conducted as a follow-up procedure if the results of the first LASIK treatment are less than satisfactory. As each patient has unique circumstances, additional surgery may be needed to achieve the desired vision correction.

S

Sclera

White part of the eye. Provides external protection for the eye, along with the cornea (the clear outer covering of the eye).

Snellen chart

Standard chart with letters, numbers or symbols printed in rows of decreasing size used by eye care professionals in distance visual acuity testing

Spherical aberration

A common higher-order aberration of lenses or the eye that causes glare and halos around lights at night.

Stroma

The cornea's middle layer; it consists of lamellae (collagen) and cells, and makes up most of the cornea.

Starbursts

Appearance of rays or fine filaments of light coming off a light source, such as a headlight of a car. Can become longer and denser at night. Severity of starbursts varies—they may be experienced differently in terms of size, shape, length of rays, the density of rays and transparency (whether the light source is visible through the starburst). Can occur as a side effect of LASIK surgery and often decreases with time. May also be caused by cataracts or other eye conditions.

Surgery complication

Complications from cataract surgery, LASIK or other eye surgeries can result in a variety of symptoms, including blurred vision, ptosis, foreign body sensation, halos around lights, light sensitivity, eye pain or discomfort, red or pink eyes, vision loss and an iris defect.

T

Tear film

A very thin film of water and other chemicals riding on top of the epithelium that lubricates the front of the eye.

Tear gland

Also called lacrimal glands. Paired almond-shaped glands, one for each eye, which secrete the aqueous layer of the tear film. They are situated in the upper, outer portion of each eye cavity.

Trauma

Injury, such as from being poked in the eye or hit in the head. Depending on the type of trauma, symptoms can include blurred vision, a bulging eye, burning, double vision, dry eyes, floaters, light sensitivity, pain or discomfort of the eye or around the eye, swelling, a pupil that is dilated or unresponsive to light, vision loss, limited eye or lid movement, ptosis, an iris defect and an eyelid cleft.

V

Visual acuity

Sharpness of vision; usually as measured with the use of a Snellen chart. 20/20 is considered normal visual acuity, though some people can see even better, such as 20/15 or 20/10.

Vitreous fluid

Clear, colorless substance that fills the eyeball between the lens and the retina.

W

Wavefront

Designed to precisely measure the visual capacity of the cornea, a wavefront device transmits a safe ray of light into the eye. The light is then reflected back off the retina, out through the pupil and into the device, where the reflected wave of light is received and arranged into a unique pattern that captures the patient-specific refractive errors (lower- and higher-order aberrations). The patient's visual irregularities are then displayed as a 3-D map, referred to as a wavefront map.