GLOSSARY OF EYE TERMINOLOGY


A

accommodation (uh-kah-muh-DAY-shun). Increase in optical power by the eye in order to maintain a clear image (focus) as objects are moved closer. Occurs through a process of ciliary muscle contraction and zonular relaxation that causes the elastic-like lens to "round up" and increase its optical power. Natural loss of accommodation with increasing age is called presbyopia.

after-cataract, secondary cataract. Remnants of an opaque lens remaining in the eye, or opacities forming, after extracapsular cataract removal.

age-related macular degeneration (AMD, ARMD) (MAK-yu-lur). Group of conditions that include deterioration of the macula, resulting in loss of sharp central vision. Two general types: "dry," which is more common, and "wet," in which abnormal new blood vessels grow under the retina and leak fluid and blood (neovascularization), further disturbing macular function. Most common cause of decreased vision after age 60.

ALK. See automated lamellar keratoplasty.

amblyopia (am-blee-OH-pee-uh), "lazy eye." Decreased vision in one or both eyes without detectable anatomic damage in the eye or visual pathways. Usually uncorrectable by eyeglasses or contact lenses.

Amsler grid (AM-slur). Test card; grid (black lines on white background or white lines on black background) used for detecting central visual field distortions or defects, such as in macular degeneration.

angle, anterior chamber angle. Junction of the front surface of the iris and back surface of the cornea, where aqueous fluid filters out of the eye.

anterior chamber. Fluid-filled space inside the eye between the iris and the innermost corneal surface (endothelium).

aphakia (ay-FAY-kee-uh). Absence of the eye's crystalline lens, such as after cataract extraction.
aqueous (AY-kwee-us), aqueous humor. Clear, watery fluid that fills the space between the back surface of the cornea and the front surface of the vitreous, bathing the lens. Produced by the ciliary processes. Nourishes the cornea, iris, and lens and maintains intraocular pressure.

A-scan. Type of ultrasound, radar-like device that emits very high frequency waves that are reflected by the ocular structures and converted into electrical impulses. Used for differentiating normal and abnormal eye tissue or for measuring length of eyeball.

asthenopia (as-then-OH-pee-uh). Vague eye discomfort arising from use of the eyes; may consist of eyestrain, headache, and/or browache. May be related to uncorrected refractive error or poor fusional amplitudes.

astigmatism (uh-STIG-muh-tiz-um). Optical defect in which refractive power is not uniform in all directions (meridians). Light rays entering the eye are bent unequally by different meridians, which prevents formation of a sharp image focus on the retina. Slight uncorrected astigmatism may not cause symptoms, but a large amount may result in significant blurring and headache.

automated lamellar keratoplasty (ALK). Excision of the outer corneal layers (lamellae) with a computer controlled keratome (knife), usually as a part of a refractive keratoplasty procedure.

B

background retinopathy. See diabetic retinopathy.

bifocals. Eyeglasses that incorporate two different powers in each lens, usually for near and distance corrections.

binocular vision. Blending of the separate images seen by each eye into one composite image.

blepharitis (blef-uh-RI-tus). Inflammation of the eyelids, usually with redness, swelling, and itching.

blind spot. Sightless area within the visual field of a normal eye. Caused by absence of light sensitive photoreceptors where the optic nerve enters the eye.

B-scan. Type of ultrasound; provides a cross-section view of tissues that cannot be seen directly. High frequency waves are reflected by eye tissues and orbital structures and converted into electrical pulses, which are displayed on a printout.

C

cataract. Opacity or cloudiness of the crystalline lens, which may prevent a clear image from forming on the retina. Surgical removal of the lens may be necessary if visual loss becomes significant, with lost optical power replaced with an intraocular lens, contact lens, or aphakic spectacles. May be congenital or caused by trauma, disease, or age.
**cataract extraction.** Removal of a cloudy lens from the eye. An *extracapsular* cataract extraction leaves the rear lens capsule intact; with an *intracapsular* extraction there is complete removal of lens with its capsule, usually by cryoextraction.

**central retinal artery.** First branch of the ophthalmic artery; supplies nutrition to the inner two-thirds of the retina.

**central retinal vein.** Blood vessel that collects retinal venous blood drainage; exits the eye through the optic nerve.

**central vision.** An eye's best vision; used for reading and discriminating fine detail and color. Results from stimulation of the fovea and the macular area.

**chalazion** (kuh-LAY-zee-un). Inflammed lump in a meibomian gland (in the eyelid). Inflammation usually subsides, but may need surgical removal. Sometimes called an *internal hordeolum.*

**choroid** (KOR-oyd). Vascular (major blood vessel) layer of the eye lying between the retina and the sclera. Provides nourishment to outer layers of the retina.

**color blindness.** Reduced ability to discriminate between colors, especially shades of red and green. Usually hereditary.

**cone.** Light-sensitive retinal receptor cell that provides sharp visual acuity and color discrimination.

**conjunctiva** (kahn-junk-TI-vuh). Transparent mucous membrane covering the outer surface of the eyeball except the cornea, and lining the inner surfaces of the eyelids.

**conjunctivitis** (kun-junk-tih-VI-tis), "pink eye." Inflammation of the conjunctiva. Characterized by discharge, grittiness, redness and swelling. Usually viral in origin, but may be bacterial or allergic; may be contagious.

**convergence.** Inward movement of both eyes toward each other, usually in an effort to maintain single binocular vision as an object approaches.

**cornea** (KOR-nee-uh). Transparent front part of the eye that covers the iris, pupil, and anterior chamber and provides most of an eye's optical power.

**cross-eyes.** See *esotropia.*

**crystalline lens.** The eye's natural lens. Transparent, biconvex intraocular tissue that helps bring rays of light to a focus on the retina.
cycloplegic refraction. Assessment of an eye's refractive error after lens accommodation has been paralyzed with cycloplegic eyedrops (to eliminate variability in optical power caused by a contracting lens).

D

diabetic retinopathy (ret-in-AHP-uh-thee). Spectrum of retinal changes accompanying long-standing diabetes mellitus. Early stage is background retinopathy. May advance to proliferative retinopathy, which includes the growth of abnormal new blood vessels (neovascularization) and fibrous tissue.

dilated pupil. Enlarged pupil, resulting from contraction of the dilator muscle or relaxation of the iris sphincter. Occurs normally in dim illumination, or may be produced by certain drugs (mydriatics, cycloplegics) or result from blunt trauma.

diopter (D) (di-AHP-tur). Unit to designate the refractive power of a lens.

diplopia, double vision. Perception of two images from one object; images may be horizontal, vertical or diagonal.

drusen (DRU-zin). Tiny, white hyaline deposits on Bruch's membrane (of the retinal pigment epithelium). Common after age 60; sometimes an early sign of macular degeneration.

dry eye syndrome. Corneal and conjunctival dryness due to deficient tear production, predominantly in menopausal and post-menopausal women. Can cause foreign body sensation, burning eyes, filamentary keratitis, and erosion of conjunctival and corneal epithelium.

E

ectropion (ek-TROH-pee-un). Outward turning of the upper or lower eyelid so that the lid margin does not rest against the eyeball, but falls or is pulled away. Can create corneal exposure with excessive drying, tearing, and irritation. Usually from aging.

emmetropia (em-uh-TROH-pee-uh). Refractive state of having no refractive error when accommodation is at rest. Images of distant objects are focused sharply on the retina without the need for either accommodation or corrective lenses.

entropion (en-TROH-pee-un). Inward turning of upper or lower eyelid so that the lid margin rests against and rubs the eyeball.

esotropia (ee-soh-TROH-pee-uh), cross-eyes. Eye misalignment in which one eye deviates inward (toward nose) while the other fixates normally.

excimer laser (EKS-ih-mur). Class of ultraviolet lasers that removes tissue accurately without heating it. In refractive corneal surgery, controlled by computer to make precise pre-programmed
shavings of eye tissue to produce a given optical correction. Used for photorefractive keratectomy (PRK); combined with automated lamellar keratoplasty (ALK) to produce LASIK (laser in situ keratomileusis).

**exotropia** (eks-oh-TROH-pee-uh), **wall-eyes**. Eye misalignment in which one eye deviates outward (away from nose) while the other fixates normally.

**extraocular muscles** (eks-truh-AHK-yu-lur). Six muscles that move the eyeball (lateral rectus, medial rectus, superior oblique, inferior oblique, superior rectus, inferior rectus).

**eyelids**. Structures covering the front of the eye, which protect it, limit the amount of light entering the pupil, and distribute tear film over the exposed corneal surface.

**F**

**farsightedness**. See **hyperopia**.

**floaters**. Particles that float in the vitreous and cast shadows on the retina; seen as spots, cobwebs, spiders, etc. Occurs normally with aging or with vitreous detachment, retinal tears, or inflammation.

**fluorescein angiography** (FLOR-uh-seen an-jee-AH-gruh-fee). Technique used for visualizing and recording location and size of blood vessels and any eye problems affecting them; fluorescein dye is injected into an arm vein, then rapid, sequential photographs are taken of the eye as the dye circulates.

**fovea** (FOH-vee-uh). Central pit in the macula that produces sharpest vision. Contains a high concentration of cones and no retinal blood vessels.

**fundus**. Interior posterior surface of the eyeball; includes retina, optic disc, macula, posterior pole. Can be seen with an ophthalmoscope.

**G**

**glaucoma** (glaw-KOH-muh). Group of diseases characterized by increased intraocular pressure resulting in damage to the optic nerve and retinal nerve fibers. A common cause of preventable vision loss. May be treated by prescription drugs or surgery.

**gonioscopy** (goe-nee-AHS-koh-pee). Examination of the anterior chamber angle through a goniolens (special type of contact lens).

**H**

**hyperopia** (hi-pur-OH-pee-uh), **farsightedness**. Focusing defect in which an eye is underpowered. Thus light rays coming from a distant object strike the retina before coming to
sharp focus, blurring vision. Corrected with additional optical power, which may be supplied by a plus lens (spectacle or contact) or by excessive use of the eye's own focusing ability (accommodation).

**hyphema** (hi-FEE-muh). Blood in the anterior chamber, such as following blunt trauma to the eyeball.

**I**

**intraocular pressure.** 1. Fluid pressure inside the eye. 2. The assessment of pressure inside the eye with a tonometer. Also called tension.

**IOL (intraocular lens).** Plastic lens that may be surgically implanted to replace the eye's natural lens.

**iris.** Pigmented tissue lying behind the cornea that gives color to the eye (e.g., blue eyes) and controls amount of light entering the eye by varying the size of the pupillary opening.

**K**


**keratometry** (kehr-uh-TAH-mih-tree). Obtaining corneal curvature measurements with a keratometer.

**L**

**lacrimal gland.** Almond-shaped structure that produces tears. Located at the upper outer region of the orbit, above the eyeball.

**laser.** Acronym: Light Amplification by Stimulated Emission of Radiation. High energy light source that uses light emitted by the natural vibrations of atoms (of a gas or solid material) to cut, burn or dissolve tissues for various clinical purposes: in the retina, to treat diabetic retinopathy and macular degeneration, to destroy leaking and new blood vessels (neovascularization); on the iris or trabecular meshwork, to decrease pressure in glaucoma; after extracapsular cataract extraction, to open the posterior lens capsule.

**LASIK** (LAY-sik). Acronym: LAser in SItu Keratomileusis. Type of refractive surgery in which the cornea is reshaped to change its optical power. A disc of cornea is raised as a flap, then an excimer laser is used to reshape the intrastromal bed, producing surgical flattening of the cornea. Used for correcting myopia, hyperopia, and astigmatism.

"lazy eye." See *amblyopia.*
legal blindness. Best-corrected visual acuity of 20/200 or less, or reduction in visual field to 20¡ or less, in the better seeing eye.

lens, crystalline lens. The eye's natural lens. Transparent, biconvex intraocular tissue that helps bring rays of light to a focus on the retina.

low vision. Term usually used to indicate vision of less than 20/200.

M

macula. Small central area of the retina surrounding the fovea; area of acute central vision.

myopia (mi-OH-pee-uh), nearsightedness. Focusing defect in which the eye is overpowered. Light rays coming from a distant object are brought to focus in front of the retina. Requires a minus lens correction to "weaken" the eye optically and permit clear distance vision.

N

nearsightedness. See myopia.

neovascularization (nee-oh-VAS-kyu-lur-ih-ZAY-shun). Abnormal formation of new blood vessels, usually in or under the retina or on the iris surface. May develop in diabetic retinopathy, blockage of the central retinal vein, or macular degeneration.

nystagmus (ni-STAG-mus). Involuntary, rhythmic side-to-side or up and down (oscillating) eye movements that are faster in one direction than the other.

O


ophthalmoscope (ahf-THAL-muh-skohp). Illuminated instrument for visualizing the interior of the eye (especially the fundus).

optic disc, optic nerve head. Ocular end of the optic nerve. Denotes the exit of retinal nerve fibers from the eye and entrance of blood vessels to the eye.

optician (ahp-TISH-un). Professional who makes and adjusts optical aids, e.g., eyeglass lenses, from refraction prescriptions supplied by an ophthalmologist or optometrist.

optic nerve. Largest sensory nerve of the eye; carries impulses for sight from the retina to the brain.
optometrist (ahp-TAHM-uh-trist). Doctor of optometry (OD) specializing in vision problems, treating vision conditions with spectacles, contact lenses, low vision aids and vision therapy, and prescribing medications for certain eye diseases.

orthoptics. Discipline dealing with the diagnosis and treatment of defective eye coordination, binocular vision, and functional amblyopia by non-medical and non-surgical methods, e.g., glasses, prisms, exercises.

Patching. Covering an amblyopic patient's preferred eye, to improve vision in the other eye.

perimetry (puh-RIM-ih-tree). Method of charting extent of a stationary eye's field of vision with test objects of various sizes and light intensities. Aids in detection of damage to sensory visual pathways.

Peripheral vision. Side vision; vision elicited by stimuli falling on retinal areas distant from the macula.

phacoemulsification (fay-koh-ee-mul-sih-fih-KAY-shun). Use of ultrasonic vibration to shatter and break up a cataract, making it easier to remove.

photophobia (foh-toh-FOH-bee-uh). Abnormal sensitivity to, and discomfort from, light. May be associated with excessive tearing. Often due to inflammation of the iris or cornea.

pinguecula (pin-GWEK-yu-luh). Yellowish-brown subconjunctival elevation composed of degenerated elastic tissue; may occur on either side of the cornea. Benign.

"pink eye." See conjunctivitis.

presbyopia (prez-bee-OH-pee-uh). Refractive condition in which there is a diminished power of accommodation arising from loss of elasticity of the crystalline lens, as occurs with aging. Usually becomes significant after age 45.

PRK (photorefractive keratectomy). Use of high intensity laser light (e.g., an excimer laser) to reshape the corneal curvature; for correcting refractive errors. Includes laser sculpting, LASIK.

progressive addition lens (PAL), progressive-power lens. Eyeglass lens that incorporates corrections for distance vision through midrange, to near vision (usually in lower part of lens), with smooth transitions and no bifocal demarcation line.

proliferative retinopathy. See diabetic retinopathy.

ptosis (TOH-sis). Drooping of upper eyelid. May be congenital or caused by paralysis or weakness of the 3rd cranial nerve or sympathetic nerves, or by excessive weight of the upper lids.

pupil. Variable-sized black circular opening in the center of the iris that regulates the amount of light that enters the eye.

R
radial keratotomy (RK) (keh-ruh-TAH-tuh-mee). Series of spoke-like (radial) cuts made in the corneal periphery to allow the central cornea to flatten, reducing its optical power and thereby correcting nearsightedness.

refraction. Test to determine an eye's refractive error and the best corrective lenses to be prescribed. Series of lenses in graded powers are presented to determine which provide sharpest, clearest vision.

refractive error. Optical defect in an unaccommodating eye; parallel light rays are not brought to a sharp focus precisely on the retina, producing a blurred retinal image. Can be corrected by eyeglasses, contact lenses, or refractive surgery.

retina (RET-ih-nuh). Light sensitive nerve tissue in the eye that converts images from the eye's optical system into electrical impulses that are sent along the optic nerve to the brain. Forms a thin membranous lining of the rear two-thirds of the globe.

retinal detachment. Separation of the retina from the underlying pigment epithelium. Disrupts visual cell structure and thus markedly disturbs vision. Almost always caused by a retinal tear; often requires immediate surgical repair.

retinoscope (RET-in-uh-skohp). Device for measuring an eye's refractive error with no response required from the patient. Light is projected into the eye, and the movements of the light reflection from the eye are neutralized (eliminated) with lenses.

rod. Light-sensitive, specialized retinal receptor cell that works at low light levels (night vision). A normal retina contains 150 million rods.

S

Schlemm's canal (shlemz). Circular channel deep in corneoscleral junction (limbus) that carries aqueous fluid from the anterior chamber of the eye to the bloodstream.

sclera (SKLEH-ruh). Opaque, fibrous, protective outer layer of the eye ("white of the eye") that is directly continuous with the cornea in front and with the sheath covering optic nerve behind.

secondary cataract. See after-cataract.
**slit lamp.** Microscope used for examining the eye; allows cornea, lens and otherwise clear fluids and membranes to be seen in layer-by-layer detail.

**Snellen chart.** Test chart used for assessing visual acuity. Contains rows of letters, numbers, or symbols in standardized graded sizes, with a designated distance at which each row should be legible to a normal eye. Usually tested at 20 ft.

**strabismus** (struh-BIZ-mus). Eye misalignment caused by extraocular muscle imbalance: one fovea is not directed at the same object as the other.

**sty, stye.** Acute pustular infection of the oil glands of Zeis, located in an eyelash follicle at the eyelid margin.

**T**


**trabecular meshwork** (truh-BEK-yu-lur). Mesh-like structure inside the eye at the iris-scleral junction of the anterior chamber angle. Filters aqueous fluid and controls its flow into the canal of Schlemm, prior to its leaving the anterior chamber.

**trifocal** (TRI-foh-kul). Eyeglass lens that incorporates three lenses of different powers. The main portion is usually focused for distance (20 ft.), the center segment for about 2 ft., and the lower segment for near (14 in.).

**20/20.** Normal visual acuity. Upper number is the standard distance (20 feet) between an eye being tested and the eye chart; lower number indicates that a tested eye can see the same small standard-sized letters or symbols as a normal eye at 20 feet.

**U**

**uvea, uveal tract** (YU-vee-uh). Pigmented layers of the eye (iris, ciliary body, choroid) that contain most of the intraocular blood vessels.

**V**

**visual acuity.** Assessment of the eye's ability to distinguish object details and shape, using the smallest identifiable object that can be seen at a specified distance (usually 20 ft. or 16 in.).

**visual field.** Full extent of the area visible to an eye that is fixating straight ahead.

**vitreous** (VIT-ree-us), **vitreous humor.** Transparent, colorless gelatinous mass that fills the rear two-thirds of the eyeball, between the lens and the retina.
**vitreous detachment.** Separation of vitreous gel from retinal surface. Usually innocuous, but can cause retinal tears, which may lead to retinal detachment. Frequently occurs with aging as the vitreous liquifies, or in some disease states, e.g. diabetes and high myopia.

**WYZ**

**wall-eyes.** See *exotropia.*

**YAG laser.** Laser that produces short pulsed, high energy light beam to cut perforate, or fragment tissue.

**zonules (ZAHN-yoolz).** *Anatomy.* Radially arranged fibers that suspend the lens from the ciliary body and hold it in position.

**Terminology**

**20/20** - the expression for normal eyesight. This notation is expressed as a fraction. The numerator (1st number) refers to the distance you were from the test chart, which is usually 20 feet. The denominator (2nd number) denotes the distance at which a person with normal eyesight could read the line with the smallest letters that you could correctly read. For example, if your visual acuity is 20/100 that means that the line you correctly read at 20 feet could be read by a person with normal vision at 100 feet. The Snellen chart, which consists of letters, numbers, or symbols, is used to test visual acuity (sharpness of eyesight). A refraction test is used to determine the amount of correction needed for a prescription when treating refractive error such as astigmatism, myopia, or hyperopia.

**Accommodation** - (eye focusing) the eye's ability to adjust its focus by the action of the ciliary muscle on the crystalline lens. When this accommodation skill is working properly, the eye can focus and refocus quickly and effortlessly, which is similar to an automatic focus feature on a camera. The ability of the eye to accommodate does decrease with age due to the crystalline lens becoming less flexible causing a condition called presbyopia. (See "Presbyopia").

**Accommodative Fatigue** - the inability of the eye to adequately sustain sufficient focusing over an extended time period. The most common sign or symptom is blurred vision after prolonged near work such as reading and using a computer. In addition, such patients often have asthenopia (eyestrain), general fatigue, headaches and nausea, excess tearing, and an unusual sensitivity to light. Plus lenses (glasses or contacts) and vision therapy are effective in treating this condition.

**Accommodative Esotropia** - when an individual is focusing on a near object and his or her eyes are turning inward too much. In people who are highly hyperopic, the eyes can also turn inward when focusing on a distant object. The average age of onset is 2 1/2 years. It is most noticeable when the child is tired or sick. This is treated with plus lenses (glasses or contacts) to help straighten the eyes. In some cases, vision therapy and corrective lenses are prescribed. (Please
note that Accommodative Esophoria is a condition similar to Accommodative Esotropia but lesser in extent.)

**Accommodative Excess (AE)** - also called *accommodative spasm*. It is an over stimulation of the focusing action of the crystalline lens causing an inability to relax the focusing system. This may result in blurry vision when focusing at distance objects. Other symptoms include holding near work closer than normal, headaches with near work (such as reading or using a computer), eyestrain associated with near work, and possible double vision. Treatment includes a low plus lens and/or vision therapy.

**Accommodative Infacility** - a clinical condition in which the individual has difficulty changing eye focus from distance to near. Symptoms include eyestrain associated with near work (such as reading or using a computer), periodic blurring of distance vision especially following sustained near visual work, tendency to hold near work closer than expected, headaches with near work, and possible double vision. Vision therapy is an effective treatment option.

**Accommodative Insufficiency (AI)** - This clinical condition is a lack of focusing ability at a near distance. Symptoms include eyestrain, blurred vision, occasional or constant when doing near work (such as reading or using a computer), occasional unusual sensitivity to light, excess tearing, headaches, and general fatigue. Vision therapy is an effective treatment option.

**Accommodative Vergence** - a convergence response (to turn the eyes inward) which occurs as a direct result of accommodation (eye focusing).

**Amblyopia** - reduced visual acuity (poorer than 20/20) which is not correctable by glasses or contacts and is not caused by structural or pathological anomalies. This condition is often called "lazy eye" because it is typically the result of disuse. It is usually marked by blurred vision in one eye and favoring one eye over the other. About two percent of the population is affected.

Types of functional (reversible) amblyopia:

- refractive- anisometropia (the two eyes have different refractive powers), or other amblyopiogenic refractive errors (hyperopia, myopia, or astigmatism)
- strabismic- misalignment of the two eyes in which they point in different directions
- form deprivation (may also be referred to as amblyopia ex anopsia)- caused by conditions that prevent light from entering the eye. These may include congenital ptosis (droopy eyelid), corneal opacity, or cataract.

Treatment options for functional amblyopia are eye patching, prescription lenses, prisms, and vision therapy.

**Astigmatism** - light rays entering the eye do not all meet at the same point (similar to a frayed string), which results in blurred or distorted vision. An abnormally shaped cornea typically causes this condition. This condition is corrected by a cylindrical (toric) eyeglass or contact lens.
**Behavioral Optometrist** - also called **Functional Optometrist** or **Developmental Optometrist**. An optometrist who specializes in all aspects of vision as it is related to an individual's development and to the role of vision in relation to reading, computer monitor use, and sports. The optometrist may use prescription lenses and/or vision therapy to improve an individual's visual function and performance. Behavioral optometry's emphasize of visual care is in prevention, remediation, rehabilitation, and enhancement.

**Bi-lateral Integration/ Gross Motor Coordination** - visual guidance of body movements and the coordination between both sides of the body.

**Binocular Fusion Dysfunction** - a clinical condition in which the eyes are not working as a team. Vision therapy is an effective treatment option. (See "General Binocular Vision Disorder")

**Binocular Vision** - the simultaneous use of the two eyes.

**Binocularity** - the ability to use both eyes as a team and to be able to fuse (unite) two visual images into one, three-dimensional image (See "Convergence" and "Divergence").

**Color Vision Deficiency** - also known as **Colorblindness**. It is the absence of or defect in the perception of colors. Color vision is based on perception of red, green, and blue. If there is a defect in the perception of one of these colors, a color will be perceived as if it were composed only of the other two colors. Based on the color or colors for which there is defective perception, a person may suffer from red, green, or blue blindness. Color blindness in which all colors are perceived as gray is termed monochromasia. For people with the common, inherited, types of color deficiency there is no cure.

**Convergence** - the ability to use both eyes as a team and to be able to turn the eyes inward to maintain single vision up close.

**Convergence Excess (CE)** - a clinical condition in which the eyes have a tendency to turn excessively inward when viewing an object at a near distance. Symptoms may include visual fatigue while reading or using a computer, occasional blurred or double vision, and inability to comprehend or concentrate while reading. Can be improved with vision therapy and/or glasses. (See "Esophoria")

**Convergence Insufficiency (CI)** - the inability of the eyes to turn inward and/or sustain an inward turn. Symptoms include eye strain with reading and using a computer, headaches, loss of comprehension, difficulty concentrating, blurred or double vision, and eye fatigue. Vision therapy is an effective treatment option. (See "Exophoria")

**Developmental Vision Analysis** - more comprehensive than a routine eye exam, examination will evaluate all of the patient's visual abilities such as visual acuity, eye focusing skills, eye teaming skills, eye tracking skills, visual motor skills, and visual perceptual skills.

**Diplopia** - a single object is perceived as two rather than one; double vision.
**Directionality/Laterality** - directionality relates to the awareness of the relationship of one object in space to another. Laterality relates to the internal awareness of the two sides of the body. (see "Spatial Relations")

**Directionality/Laterality Disorder** - a condition in which an individual has poor development of left/right awareness. Symptoms of this disorder include confusion of right and left direction and letters and/or numbers reversals. Vision therapy is a helpful treatment option.

**Distance Acuity** - the eye's ability to distinguish an object's shape and details at a far distance such as 20 feet (6 meters).

**Divergence** - the ability to use both eyes as a team and be able to turn the eyes out toward a far object.

**Divergence Excess (DE)** - the eye's tendency to drift out relative to the direction of a distant object being viewed. Symptoms include: double vision at distance, headaches, eyestrain, nausea, dizziness, and blurred vision. Can be improved with vision therapy.

**Divergence Insufficiency (DI)** - the eye's tendency to turn more inward than necessary when viewing a distant object. Symptoms include: double vision, headaches, eyestrain, nausea, dizziness, and blurred vision. Treated with corrective lenses and vision therapy.

**Dysphoneidesia** - inability to "sound out" words and poor sight recognition of words. Dysphoneidesia is a subtype of dyslexia. Its characteristics are a combination of the other two forms of dyslexia: Dysphonesia and Dyseidetic.

**Dysphonesia** - inability to "sound out" words. Dysphonesia is a subtype of dyslexia. Children with this form of dyslexia have difficulty sequentially analyzing and remembering what and where the sounds are in words. The resulting phonemic processing problems make it difficult to sound out new words, learn phonics, and make them dependent on their sight vocabulary. When they come to an unknown word they will often substitute a word using context clues. For example, "pony" for "horse", even though the substituted word doesn't look or sound anything like the original word. When spelling unknown words it is often difficult to determine what the original word is. For example, they may write "fmlue" for "familiar" or "lap" for "lamp". They cannot learn phonics because they cannot process where the sounds are. Their short term sequential auditory memory can be poor and result in repeating "8167" as "8671", or remember to go to their room but forgetting to get the item requested.

**Dyseidetic** - poor sight recognition of words. Dyseidetic is a subtype of dyslexia. Children with this form of dyslexia have trouble analyzing and remembering written symbols. They continue to confuse the orientation. For example, they will write numbers and letters backwards long after other children have mastered these skills. They often confuse letter sequences in reading, and in spelling often get all the letters but in the wrong sequence (spelling "dose" for "does", "on" for "no", etc.). Their visual memory for words is poor, and after learning a new word they may fail to recognize that same new word later in the sentence. They have trouble learning to read and spell phonetically irregular words. For example, they may read "laugh" as "log" and spell it as
"laff", both of which are phonetically consistent. Their spelling will have many mistakes, but will be phonetically consistent and one can usually tell what the word was they were trying to spell. When they are attempting to read an unknown word they will usually attempt to sound it out and do so very slowly.

**Dyslexia** - a specific language-based disorder. The individual has difficulty with letter or word recognition, spelling, reading, writing, and sometimes naming pictures of objects. Dyslexia varies in degree from mild to very severe. It is caused by an inability of the brain's language centers to decode print or phonetically make the connection between the word's written symbols and their appropriate sounds. Dyslexia is not caused by a vision disorder. Children often are of normal or above normal intelligence. Dyslexia cannot be cured and will never be outgrown. Appropriate teaching methods can be taught to help those with dyslexia overcome their weakness. The Dyslexia Determination test which is used by many optometrists who specialize in vision related vision problems investigates if the patient has one of the three forms of dyslexia: Dyseidetic - poor sight recognition of words, Dysphonesia- inability to "sound out" words, and Dysphoneidesia - a combination of characteristics from both types. Vision therapy is NOT considered a direct treatment for dyslexia.

**Esophoria (Eso)** - a tendency of the eyes to want to turn more inward than necessary when an individual is viewing an object at near or at distance. Symptoms of basic esophoria include: eyestrain, headaches, blurred or double vision, apparent movement of print, and difficulty concentrating on and comprehending reading material. Sometimes esophoria is caused by a refractive error such as hyperopia (farsightedness), and glasses or contacts can correct the problem alone. However, sometimes vision therapy is needed to help re-train the eyes to function more appropriately. (See "Convergence Excess" and "Divergence Insufficiency")

**Esotropia (ET)** - a condition in which an eye is turned either constantly or intermittently inward toward the nose. Esotropia is a type of strabismus. Treatment options may include one or more of the following: glasses or contacts, bi-focal lenses, prisms, vision therapy, surgery, or Botulinum Toxin Type A (Oculinum, Botox®) injections. In some cases, esotropia is caused by a refractive error such as hyperopia (farsightedness), and glasses or contacts alone may allow the eyes to straighten. Vision therapy is most appropriate when there are small degrees of misalignment. If surgery is required, a combination of surgery and vision therapy often yields the best results.

**Exophoria (Exo)** - a tendency of the eyes to want to turn more outward than necessary when an individual is viewing an object at near or at distance. Symptoms of basic exophoria include: eyestrain, headaches, blurred or double vision, apparent movement of print, and difficulty concentrating on and comprehending reading material. Vision therapy is an effective treatment option. (See "Convergence Insufficiency" and "Divergence Excess")

**Exotropia (XT)** - a condition in which an eye is either constantly or intermittently turned outward toward the ear. Exotropia is a type of strabismus. Treatment options may include one or more of the following: glasses or contacts, bi-focal lenses, prisms, vision therapy, surgery, or Botulinum Toxin Type A (Oculinum, Botox®) injections. Vision therapy is most appropriate when there are small degrees of misalignment. If surgery is required, a combination of surgery and vision therapy often yields the best results.
**Extraocular Muscles** - the muscles attached to the outside of the eyeball which control eye movement. Each eye has six muscles (lateral rectus, medial rectus, superior oblique, inferior oblique, superior rectus, and inferior rectus) that are coordinated by the brain.

**Fixation** - the ability to direct and maintain steady visual attention on a target. Fixations are a form of pursuits.

**Fusion** - the union of images from each eye into a single image.

**Heterophoria** - tendency of the eyes to deviate from their normal position for visual alignment. This condition may be observed when one eye is covered.

**Heterotropia** - the eyes are abnormally turned.

**Hyperopia** - farsightedness, an individual will have difficulty seeing clearly up close. Light entering the eye focuses behind the retina when the eye is at rest and is corrected with a plus lens. Vision therapy is not prescribed for hyperopia. Children, up to about the age of 8 years, are often farsighted.

**Hyperphoria** - a condition in which one eye has a tendency to point higher than the other eye, causing eyestrain. Sometimes improved by prisms in glasses.

**Hypertropia** - strabismus, one eye turned in an upward direction.

**Hypophoria** - a condition in which one eye has a tendency to point lower than the other eye. This condition may be observed when one eye is covered.

**Hypotropia** - strabismus, one eye turned in a downward direction.

**Hysterical Amblyopia** - a non specific visual loss with an unknown cause. Upon examination the doctor is unable to find corroborating objective evidence of this abnormality. The most common symptom is an isolated visual acuity impairment, followed by combined visual acuity impairment and visual field constriction, and whereas an isolated visual field constriction occurred most infrequently. This vision loss may be due to anxiety or emotional repression. (See "Streff Syndrome")

**Learning Disability (LD)** - a disorder that affects people's ability to either interpret what they see and hear or to link information from different parts of the brain. Learning disabilities can be divided into five broad categories: speech and language disorders, reading disorder, arithmetic disorder, writing disorder, and attention disorders. The term learning disability does not include children who have learning problems that are primarily the result of visual, hearing, or motor disorders.

**Myopia** - nearsightedness, an individual will have difficulty seeing clearly at distance. It is corrected with a minus lens. Typically, vision therapy is not prescribed for myopia.
Near Acuity - the eye's ability to distinguish an object's shape and details at a near distance such as 16 inches (40 cm).

Nystagmus - rhythmic oscillations or tremors of the eyes which occur independent of the normal eye movements. Generally nystagmus is not curable, but it is manageable. Treatments include prescription glasses or contact lenses, prisms, and vision therapy.

Occlusion - to block out light. An eye can be completely or partially blocked. Occlusion is often used to promote the use of one eye or both eyes. This therapy procedure may be used for people with amblyopia, strabismus, or closed head trauma. It may also be used in a vision therapy program for someone with amblyopia, eye focusing (accommodation) disorder, or poor eye tracking (oculomotor) skill.

Ocular Motor Dysfunction - poor eye movement skills. Vision therapy is an effective treatment option.

Oculomotor Skills - the ability to quickly and accurately move our eyes. These are sensory motor skills that allow us to move our eyes so we can fixate on objects (fixation), move our eyes smoothly from point to point as in reading (saccades), and to track a moving object (pursuits). (See "Fixation", "Pursuits" and "Saccades")

Optometric Vision Therapy (VT) - as defined by the American Optometric Association: Optometric vision therapy is a treatment plan used to correct or improve specific dysfunctions of the vision system. It includes, but is not limited to, the treatment of strabismus (turned eye), other dysfunctions of binocularity (eye teaming), amblyopia (lazy eye), accommodation (eye focusing), ocular motor function (general eye movement ability), and visual-perception-motor abilities.

Optometric vision therapy is based upon a medically necessary plan of treatment which is designed to improve specific vision dysfunctions determined by standardized diagnostic criteria. Treatment plans encompass lenses, prisms, occlusion (eye patching), and other appropriate materials, modalities, and equipment. (Vision therapy can also be called visual or vision training, orthoptics, eye training, or eye exercises.)

Optometrist - a health care professional who is state licensed to provide primary eye care service. These services include comprehensive eye health and vision examinations; diagnosis and treatment of eye disease and vision disorders; the detection of general health problems; the prescribing of glasses, contact lenses, low vision rehabilitation, vision therapy, and medications; the performing of certain surgical procedures; and the counseling of patients regarding their surgical alternatives and vision needs as related to their occupations, avocations and lifestyle. The optometrist has completed pre-professional undergraduate education in a college or university and four years of professional education at a college of optometry, leading to the doctor of optometry (O.D.) degree. (see "Developmental Optometrist")

Orthophoria (ortho) - The eyes do not have a tendency to want to turn more inward than necessary or want to turn more outward than necessary when pointed on an object.
Orthoptics - the science of correcting defects in binocular vision. The technique of eye exercises to correct strabismus (esotropia or exotropia), convergence insufficiency (exophoria), or convergence excess (esophoria), amblyopia, and ocular motility disorders. Orthoptics is a limited form of optometric vision therapy.

Perceptual Skills - includes the identification, discrimination, spatial awareness, and visual-sensory integration. These are visual cognitive skills used to processes visual information to the brain to be organized and interpreted. (See "Visual Perceptual Disorder")

Physiological Diplopia - a normal diplopia (double vision) that occurs when an individual is not pointing his/her eyes on a certain object.

Presbyopia - the natural process of the eye losing the ability to accommodate or change the shape of the natural crystalline lens inside the eye to see comfortably at near. This vision defect occurs with the advancement of age; the onset usually occurs between the ages of 40 to 45. A plus lens for near work, or multi-focal lens (such as a bifocal lens) is prescribed in the form of glasses or contact lenses. Vision therapy is not a treatment option.

Prism - a wedge-shaped lens which is thicker on one edge than the other. This plastic or glass lens bends light (opposite direction from its thicker end), which will visually move the image when looking through it. Prisms can be used to measure an eye misalignment and/or treat a binocular dysfunction (eye teaming problem). A prism is sometimes added to glasses to help improve eyesight due to an eye misalignment or visual field loss.

Pursuit Dysfunction - a condition in which the individual's ability to follow a moving target is inadequate. Vision therapy is an effective treatment option. (See "Ocular Motor Dysfunction")

Reading - requires the use of good visual skills, which are distance and near acuity, accommodation skills, binocularity skills (convergence), oculomotor skills (saccadic), peripheral vision, figure-ground, form constancy, spatial relations, visual closure, visual discrimination, visual memory, and visualization.

Refractive Error - defects in vision caused by the eye's inability to bend, or refract light and focus it clearly on the retina. Astigmatism, hyperopia, and myopia are common conditions of refractive error, also called ametropia.

Saccades - the eye's ability to direct and coordinate movement as it quickly and voluntarily shift from one target to another.

Saccades Dysfunction - a condition in which the individual's ability to scan along a printed page and move his eyes from point to point is inadequate. Symptoms include frequent loss of place while reading, skip or transpose words, and have difficulty comprehending because of an inaccurate eye movement. Vision therapy is an effective treatment option. (See "Ocular Motor Dysfunction")
Spatial Relation - the ability to judge the relative position of one object to another and the internal awareness of the two sides of the body. These skills allow the individual to develop the concepts of right, left, front, back, up, and down. This ability is needed in reading and math. (See "Directionality/Laterality")

Squint - the inability to direct both eyes simultaneously toward a point. Also known as strabismus (turned eye). (see "Strabismus")

Stereopsis - the ability to perceive a three dimensional depth which requires adequate fusion (union) of the images from each eye.

Strabismus - turned eye(s), the eyes are misaligned. In strabismus, the eyes send conflicting images to the brain, and the brain cannot combine these images as it would in normal vision. The brain compensates by ignoring one image in favor of the other, causing a loss of depth perception. Strabismus affects four percent of all.

It is characterized by using the following categories:

- Unilateral strabismus: Strabismus in which only one eye deviates.
- Alternating strabismus: Strabismus in which the deviating eye can change.
- Intermittent strabismus: Strabismus which is not present at all times.
- Constant strabismus: Strabismus which is present at all times.
- Periodic strabismus: Strabismus which occurs at one testing distance but not at another.

Treatment options may include one or more of the following: optical lenses, bi-focal lenses, prisms, surgery, vision therapy, or Botulinum Toxin Type A (Oculinum, Botox®) injections. (See "Esotropia", "Exotropia", "Hypertropia", and "Hypotropia")

Streff Syndrome - This functional vision loss is also known as Non-Malingering Syndrome. Signs include reduced visual acuity in both eyes at distance and near. The visual acuity at near is more reduced than the distance acuity. The syndrome is associated with a visual or emotional stress occurring in the child's life. It is more prominent in girls (ages 7-13) than boys. Treatment includes a low plus lens and/or vision therapy.

Suppression of Binocular Vision - when the brain ignores the image that is seen by one eye. It is the result of weak eye teaming skills (binocularity).

Tranaglyph - red/green targets used with red/green glasses to develop eye teaming skills.

Vectogram - a three-dimensional picture that is used to strengthen the binocularity system. Available in fixed and variable styles to provide base-in and/or base-out training. 3D glasses are used to view the picture.

Vergence - to turn the eyes horizontally (convergence- inward or divergence- outward). Accommodative vergence, fusional vergence, proximal vergence, and tonic vergence are needed to maintain single vision.
**Vision Therapy (VT)** - see "Optometric Vision Therapy"

**Vision Therapist** - Optometrist or an optometric vision therapy technician who develops and administers vision therapy programs. (Typically this term is referring to a vision therapy technician rather than an optometrist.)

Please note that there are some individuals that call themselves vision therapists, but they are not optometrists or vision therapy technicians.

**Visual Acuity** - sharpness or clearness of eyesight. (See "Near Acuity" and "Distance Acuity", "20/20")

**Visual Analysis** - refers to figure-ground, form constancy, spatial relation, visual closure, visual discrimination, visual memory, and visualization.

**Visual Closure** - the ability to identify or recognize a symbol or object when the entire object is not visible.

**Visual Discrimination** - the ability to discriminate between visible likeness and differences in size, shape, pattern, form, position, and color. Such as the ability to distinguish between similar words like "ran" and "run".

**Visual Form Dysfunction** - difficulty with figure-ground, form constancy, visual closure, and visual discrimination. Symptoms include confusion with similar objects, words, or colors. Vision therapy is a treatment option.

**Visual Memory Dysfunction** - difficulty with retention, recall, or recognition of things seen. Symptoms can include poor spelling and poor recall of visual information. Vision therapy is a treatment option.

**Visual-Motor Dysfunction** - the inability to process and reproduce visual images by writing or drawing. Symptoms can include poor pencil grip/writing, poor organization on written page, poor copying/spacing, and excessive erasing. Vision therapy is a treatment option.

**Visual-Motor Integration (VMI)** - after visual data is gathered, it is processed and combined in the brain with information from movement (eye-hand coordination).

**Visual Perceptual Disorders** - information processing dysfunctions of the visual system. These dysfunctions can be a directionality/laterality disorder, visual form dysfunction, visual memory dysfunction, and visual-motor dysfunction. Vision therapy is a treatment option. (Also see "Perceptual Skills")

**Visual Perceptual Skills** - the ability to organize and interpret information that is seen and give it meaning. These information-processing skills include figure-ground, form constancy, spatial relations, visual closure, visual discrimination, visual memory, and visualization.
**Visual-Sensory Integration** - after visual data is gathered, it is processed and combined in the brain with information from hearing (auditory-visual integration), balance (gross-motor/bilateral integration), posture, and movement (visual-motor integration).

**Visual Sequential Memory**- ability to recall a sequence of numbers, letters or objects in the order they were originally given.

**Visualization**- the ability to create and manipulate mental pictures of an object or concept on the basis of past visual experience and memory. Essential in reading and playing sports.