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Hester Eye Associates offers comprehensive eye care services and in-demand lenses and frames to Kennesaw and the surrounding communities. Click or call to connect, and access the quality of vision care you deserve. Request Appointment Or give us a call (770) 590-8191 Health & Medicine Anatomy & Physiology human eye, in humans, specialized sense organ capable of receiving visual images, which are then carried to the brain. The eye is protected from mechanical injury by being enclosed in a socket, or orbit, which is made up of portions of several of the bones of the skull to form a four-sided pyramid, the apex of which points back into the head. Thus, the floor of the orbit is made up of parts of the maxilla, zygomatic, and palatine bones, while the roof is made up of the orbital plate of the frontal bone and, behind this, by the lesser wing of the sphenoid. The optic foramen, the opening through which the optic nerve runs back into the brain and the large ophthalmic artery enters the orbit, is at the nasal side of the apex; the superior orbital fissure is a larger hole through which pass large veins and nerves. These nerves may carry nonvisual sensory messages.g., painor they may be motor nerves controlling the muscles of the eye. There are other fissures and canals transmitting nerves and blood vessels. The eyeball and its functional muscles are surrounded by a layer of orbital fat that acts much like a cushion, permitting a smooth rotation of the eyeball about a virtually fixed point, the centre of rotation. The protrusion of the eyeballsproptosis exophthalmic gottre is caused by the collection of fluid in the orbital fatty tissue. eyelidUpper and lower eyelids.It is vitally important that the front surface of the eyeball, the cornea, remain moist. This is achieved by the eyelids, which during waking hours sweep the secretions of the lacrimal apparatus and other glands over the surface at regular intervals and which during sleep cover the eyes and prevent evaporation. The lids have the additional function of preventing injuries from foreign bodies, through the operation of the blink reflex. The lids are essentially folds of tissue covering the front of the orbit and, when the eye is open, leaving an almond-shaped aperture. The points of the almond are called canthi; that nearest the nose is the inner canthus, and the other is the outer canthus. The lid may be divided into four layers: (1) the skin, containing glands that open onto the surface of the lid margin, and the eyelashes; (2) a muscular layer containing principally the orbicularis oculi muscle, responsible for lid closure; (3) a fibrous layer that gives the lid its mechanical stability, its principal portions being the tarsal plates, which border directly upon the opening between the lids, called the palpebral aperture; and (4) the innermost layer of the lid, a portion of the conjunctiva. The conjunctiva is a mucous membrane that serves to attach the eyeball to the orbit and lids but permits a considerable degree of rotation of the eyeball in the orbit. The conjunctiva lines the lids and then bends back over the surface of the eyeball, constituting an outer covering to the forward part of this and terminating at the transparent region of the eye, the cornea. The portion that lines the lids is called the palpebral portion of the conjunctiva; the portion covering the white of the eyeball is called the bulbar conjunctiva. Between the bulbar and the palpebral conjunctiva there are two loose, redundant portions forming recesses that project back toward the equator of the globe. These recesses are called the upper and lower fornices, or conjunctival sacs; it is the looseness of the conjunctiva at these points that makes movements of lids and eyeball possible. Facts You Should Know: The Human Body Quiz The fibrous layer, which gives the lid its mechanical stability, is made up of the thick, and relatively rigid, tarsal plates, bordering directly on the palpebral aperture, and the much thinner palpebral fascia, or sheet of connective tissue; the two together are called the septum orbitale. When the lids are closed, the whole opening of the orbit is covered by this septum. Two ligaments, the medial and lateral palpebral ligaments, attached to the orbit and to the septum orbitale, stabilize the position of the lids in relation to the globe. The medial ligament is by far the stronger. Closure of the lids is achieved by contraction of the orbicularis muscle, a single oval sheet of muscle extending from the regions of the forehead and face and surrounding the orbit into the lids. It is divided into orbital and palpebral portions, and it is essentially the palpebral portion, within the lid, that causes lid closure. The palpebral portion passes across the lids from a ligament called the medial palpebral ligament and from the neighbouring bone of the orbit in a series of half ellipses that meet outside the outer corner of the eye, the lateral canthus, to form a band of fibres called the lateral palpebral raphe. Additional parts of the orbicularis have been given separate namesnamely, Horners muscle and the muscle of Riolan; they come into close relation with the lacrimal apparatus and assist in drainage of the tears. The muscle of Riolan, lying close to the lid margins, contributes to keeping the lids in close apposition. The orbital portion of the orbicularis is not normally concerned with blinking, which may be carried out entirely by the palpebral portion; however, it is concerned with closing the eyes tightly. The skin of the forehead, temple, and cheek is then drawn toward the medial (nose) side of the orbit, and the radiating furrows, formed by this action of the orbital portion, eventually lead to the so-called crows feet of elderly persons. It must be appreciated that the two portions can be activated independently; thus, the orbital portion may contract, causing a furrowing of the brows that reduces the amount of light entering from above, while the palpebral portion remains relaxed and allows the eyes to remain open. Opening of the eye is not just the result of passive relaxation of the orbicularis muscle but also is the effect of the contraction of the levator palpebrae superioris muscle of the upper lid. This muscle takes origin with the extraocular muscles at the apex of the orbit as a narrow tendon and runs forward into the upper lid as a broad tendon, the levator aponeurosis, which is attached to the forward surface of the tarsus and the skin covering the upper lid. Contraction of the muscle causes elevation of the upper eyelid. The nervous connections of this muscle are closely related to those of the extraocular muscle required to elevate the eye, so that when the eye looks upward the upper eyelid tends to move up in unison. The orbicularis and levator are striated muscles under voluntary control. The lids also contain smooth (involuntary) muscle fibres that are activated by the sympathetic division of the autonomic system and tend to widen the palpebral fissure (the eye opening) by elevation of the upper, and depression of the lower, lid. In addition to the muscles already described, other facial muscles often cooperate in the act of lid closure or opening. Thus, the corrugator supercillii muscles pull the eyebrows toward the bridge of the nose, making a projecting roof over the medial angle of the eye and producing characteristic furrows in the forehead; the roof is used primarily to protect the eye from the glare of the sun. The pyramidalis, or procerus, muscles occupy the bridge of the nose; they arise from the lower portion of the nasal bones and are attached to the skin of the lower part of the forehead on either side of the midline; they pull the skin into transverse furrows. In lid opening, the frontalis muscle, arising high on the forehead, midway between the coronal suture, a seam across the top of the skull, and the orbital margin, is attached to the skin of the eyebrows. Contraction therefore causes the eyebrows to rise and opposes the action of the orbital portion of the orbicularis; the muscle is especially used when one gazes upward. It is also brought into action when vision is rendered difficult either by distance or the absence of sufficient light. The outermost layer of the lid is the skin, with features not greatly different from skin on the rest of the body, with the possible exception of large pigment cells, which, although found elsewhere, are much more numerous in the skin of the lids. The cells may wander, and it is these movements of the pigment cells that determine the changes in coloration seen in some people with alterations in health. The skin has sweat glands and hairs. As the junction between skin and conjunctiva is approached, the hairs change their character to become eyelashes. The eye is kept moist by secretions of the lacrimal glands (tear glands). These almond-shaped glands under the upper lids extend inward from the outer corner of each eye. Each gland has two portions. One portion is in a shallow depression in the part of the eye socket formed by the frontal bone. The other portion projects into the back part of the upper lid. The ducts from each gland, three to 12 in number, open into the superior conjunctival fornix, or sac. From the fornix, the tears flow down across the eye and into the puncta lacrimalia, small openings at the margin of each eyelid near its inner corner. The puncta are openings into the lacrimal ducts; these carry the tears into the lacrimal sacs, the dilated upper ends of the nasolacrimal ducts, which carry the tears into the nose. The evaporation of the tears as they flow across the eye is largely prevented by the secretion of oily and mucous material by other glands. Thus, the meibomian, or tarsal glands, consist of a row of elongated glands extending through the tarsal plates; they secrete an oil that emerges onto the surface of the lid margin and acts as a barrier for the tear fluid, which accumulates in the grooves between the eyeball and the lid barriers. Skip to main content The human eye is a complex organ composed of several interconnected parts, each with a specific function in vision. Let's explore these components and their roles in enabling us to see the world around us. The conjunctiva is the membrane covering the sclera (white portion of your eye). The conjunctiva also covers the intertarsal space of your eyelids. The conjunctiva helps lubricate the eyes by generating mucus and tears. It also aids in immunological monitoring and prevents microorganisms from entering the eye. Pink eye (conjunctivitis) occurs when this thin membrane becomes inflamed or swollen. Other eye disorders that affect the conjunctiva include: Pinguecula. Accumulation of protein and fat deposits in the conjunctiva. Pterygium. A noncancerous growth that develops on the conjunctiva. Subconjunctival hemorrhages. Broken blood vessels. The whites of the eye (sclera) cover more than 80% of the eyeballs surface. The sclera has a smooth, white exterior but is brown on the inside. It has grooves that help properly attach the eye tendons, providing stability and protection while staying flexible. This allows the eye to move as needed to see different objects. The episclera is a thin layer of tissue on top of the sclera that has tiny blood vessels that provide the sclera with nutrients. If the sclera or episclera becomes inflamed, it results in a condition known as scleritis or episcleritis, respectively. These conditions can cause: Redness Eye pain Blurry vision Lid swelling The iris is the colored part of the eye and is unique to each person. This structure is located in the front of the eye, between the cornea on the outside and the lens on the inside. The iris primarily regulates how much light reaches the retina by controlling the size of the eyes window, or pupil. As a result, it narrows in bright light while opening up in low light. This is also referred to as the pupillary light reflex. The iris also performs what is known as the accommodation reflex, which is the eyes instinctive ability to shift focus from nearby to distant objects. This action requires adjusting the pupils aperture (opening), the shape of the lens, and convergence (the ability of the eyes to work together). The pupil is seen as a black dot in the center of the iris. Its essentially a hole that allows the eye to focus on the things in front of it. Similar to the iris, they open and close to regulate the amount of light that enters the eye. When light enters the eye through the lens, it focuses light rays through the pupils and into the retina. The difference between the centers of your pupils is called your pupillary distance. When its dark, our pupils dilate or expand wider to let in more light, increasing the scope of our view. In bright light, our pupils contract to a small diameter to protect our retinas delicate photoreceptors. The cornea is the clear and protective outer layer of your eye. Along with the sclera, the cornea is a barrier against dirt, infectious microorganisms, and other substances that can damage the eye. Aside from protection, the cornea also plays a significant role in vision. Its dome-shaped surface bends light as it passes through the eyes, allowing it to focus on objects effectively. The cornea can also filter out the suns harmful ultraviolet (UV) light, preventing it from reaching other structures inside the eye. However, you should still wear sunglasses to protect your eyes. Chronic exposure to UV light may lead to inflammation and other complications, including cancer. The uvea is the eyes middle layer. It is located underneath the white part of the eye (the sclera). Its composed of three parts, namely, the iris, the ciliary body, and the choroid. These structures control some eye functions, such as adapting to varying levels of light or object distances. If any structures become inflamed, the resulting condition is called uveitis. This vascular layer is located between the sclera and retina of your eye. It delivers nourishment from the blood and oxygen supply to the retinas outer layers. Essentially, the choroid is the source of life that keeps the retina functioning effectively. It also reflects light, causing the red-eye effect in photographs. The retina is a light-sensitive layer that covers your eyes rear surface. Images are transmitted to the retina when your eye picks up the images. It converts images into impulses that are sent to your brain through the optic nerve, allowing you to see and interpret images. Some of the ocular conditions that affect the retina include: Diabetic retinopathy. Diabetes complications caused by damaged blood vessels. Retinal detachment. When the retina detaches from its normal position. Retinitis pigmentosa. Deterioration of special light-sensitive cells in the retina. Retinoblastoma. Formation of cancer cells in the retinal tissues. The eye has six muscles that come from the eye socket (orbit) and work to move the eye up and down, side to side, or in a circular motion. These muscles include: The superior rectus. Attaches to the top of the eye and moves the eye upwards. The inferior rectus. Attaches to the bottom of the eye and allows downward eye movement. The medial rectus. Attaches to the side of the eye adjacent to the nose and helps the eyes to shift inwards towards the nose. The lateral rectus. Attaches to the outer side of the eyes and moves the eyes toward the temples. The superior oblique. Originates from the back of the eye socket and attaches to the top of the eye. It rotates the eye inwards (front to back) and downwards. The inferior oblique. Arises from the front of the socket near the nose and travels inwards, attaching to the bottom surface of the eyeball. Light rays are focused on the macula lutea when an eye looks directly at an object. The macula lutea is a yellow oval area in the retinas center (back of the eye). The center of the macula is known as the fovea. The macula lutea is the section of the retina responsible for sharp, detailed central vision (visual acuity). It has a high concentration of cones, which are the light-sensitive retinal cells that provide high visual acuity. The lens of the eye is the transparent lentil-shaped structure inside your eye. Its a natural lens located behind the iris and to the front of the vitreous humor which is a clear, colorless, gelatinous mass that fills the gap between the lens and the retina. The lens is held in place by a fibrous membrane known as the zonule of Zinn or the lens suspensory ligaments. The lens changes its thickness and curvature, allowing the eye to focus on objects from varying distances. If your lens has an irregular curvature, youre more prone to develop astigmatism. Cataracts are another lens-related visual disorder in which the lens becomes opaque or hazy, impairing vision. Aqueous humor is a fluid substance that fills the eye. Its divided into two chambers. The anterior chamber is in front of the iris, whereas the posterior chamber is right behind it. These layers enable the eye to keep its shape. The aqueous fluid is evacuated via the Schlemm canal to eliminate any accumulation in the eye. If a persons aqueous fluid does not drain adequately, glaucoma may develop. The ciliary body is a ring-shaped tissue found behind the iris. It attaches to the lens through the zonular fibers (fibers of Zinn). The ciliary body holds and regulates the eye lens movement, keeping the lens shape intact. This structure is also involved in the production of aqueous humor. The optic nerve is a bundle of about 1.2 million nerve fibers that transmit visual information to the central nervous system (CNS). There is one nerve per eye connecting each eye to the brain. Vision loss may occur if any of the nerves are damaged. However, the consequences of optic nerve damage depend on the extent of the damage. The optic disc is where the axons of retinal ganglion cells join together and mark the beginning of the optic nerve (second cranial nerve). It also serves as the entrance site for major blood vessels that nourish the retina. In the average person, the optic disc carries about 1.2 million nerve fibers from the retina to the brain. The fovea centralis (central fovea) is a tiny depression in the retina that houses cones that help with proper vision. It is located within the macula. Approximately 80-90% of the optic nerve fibers convey visual information from the fovea. Meanwhile, the other portion conveys information from the peripheral retina. If the fovea of the cones is affected, you may experience blurry vision. Various eye conditions can impact how well you see, these include: Myopia (nearsightedness) Hyperopia (farsightedness) Astigmatism Cataracts The best way to prevent these problems is to maintain your physical health, get regular eye exams, and eat a healthy balanced diet.. The types of conditions that can affect your eyes vary depending on the specific part(s) involved. Thats because your eyes include a variety of tissue types. It has muscle, connective tissue, nerves, blood vessels and more.Some of the different types of eye conditions include but arent limited to the following:Refractive errors. These are problems with how you see because light isnt coming into focus on your retinas correctly. Refractive errors can take many forms, such as focusing too soon (nearsightedness) or too late (farsightedness). They can also involve distortions in your sight, like with astigmatism.Corneal disorders. These are conditions that affect the cornea itself. They can happen for many reasons, ranging from congenital conditions (which you have at birth) to conditions that dont develop until later in life.Retinal disorders. These conditions can happen because of problems that affect the retina directly. They can also be secondary effects of another disease, like how lattice degeneration can lead to a retinal detachment.Optic nerve-related conditions. These affect the nerve that links the eyes and brain. Examples include optic neuritis and optic atrophy.Age-related eye disorders. These conditions are more likely to happen as you get older, especially after age 65. They range from minor concerns like age-related loss of near vision (presbyopia) to serious concerns like cataracts. Some age-related eye diseases, like macular degeneration or glaucoma, are severe enough to cause permanent vision loss.Your eyes are also susceptible to more general conditions and issues. Examples of these include:Infections.Injuries and trauma.Cancer.Congenital malformations.What are some common signs or symptoms of eye conditions?Signs and symptoms of an eye condition can vary greatly. One reason for that is the many different parts that affect or contribute to your vision. A common example of this is how a metabolic and circulatory condition like Type 2 diabetes can lead to vision loss over time.Some symptoms affect the surface of your eye only. Others affect the inside of your eye. Some key types of eye symptoms include:Eye surface issues.Eye appearance/alignment.Eye function and sight.Eye surface issuesThese symptoms affect your eyes surface or the area immediately surrounding them. They include:Irritation.Red eye.Watery eyes.Discharge, ooze or goop coming from your eyes.Eye appearance/alignmentChanges in the color of the sclera (such as blue or yellow sclera) or noticeable bleeding into the conjunctiva.Reflex or appearance changes affecting the iris or pupil (like leukocoria, coloboma, etc.).Eye misalignment (strabismus), including inward (esotropia), outward (exotropia), upward (hypertropia) or downward (hypotropia).Eye function and sightSymptoms from eye-related conditions can also affect your sight itself. The eyes are often a sense you rely on heavily, so sight- or vision-related symptoms are often easier to notice.Some of them involve changes or disruptions in how or what you see. Examples include but arent limited to the following:Trouble seeing clearly or properly. Blurred vision from refractive errors, or specific vision issues like night blindness or color blindness.Decrease or loss of vision: Sudden vision loss or low vision and blindness.Disrupted vision: Double vision or visible auras (bright haze or splotches in your field of view) like from ocular migraines.Light sensitivity (photosensitivity or photophobia): This is when bright light causes you pain or discomfort severe enough that you try to avoid brighter surroundings and prefer dimmer areas or light levels.How the link between your eyes and brain influences symptomsIts also important to remember that many causes of eye symptoms especially sight/vision changes or eye movement control symptoms may not be due to an eye condition. Some might happen due to a condition elsewhere in your body. An example of this is yellowing of the sclera when you have jaundice The familiar saying is that the eyes are a window to the soul. But from the medical perspective, theyre also like a window to your brain. Eye-related symptoms are a key way for healthcare providers to find brain conditions and issues. Thats why vision changes can be telltale indicators of brain-related issues like concussions or strokes.What are some common tests to check eye health?Many tests can detect conditions that affect your eyes directly or that cause eye symptoms. The most important of them is an eye exam. Regular eye exams can detect many eye conditions or concerns before they ever have symptoms. And eye exams can help prevent long-term vision damage or issues when you have other conditions like Type 2 diabetes.Other common tests include:Color blindness test.General imaging tests, like ultrasound or magnetic resonance imaging (MRI).Glaucoma tests.Intraocular pressure test.Retinal imaging tests.Slit lamp exam.Visual acuity test.Visual field tests.There are many tests your eye care specialist or other healthcare provider may recommend depending on your symptoms and the suspected cause(s). They may also recommend tests for other body systems that might influence or cause eye symptoms. Your specialist or provider is the best source of information about test options, what they recommend and why.What are some common treatments for eye conditions?There are many possible treatments for eye conditions, and the treatments can vary widely. Some conditions or concerns that are common or not severe may have simpler treatments. Other conditions or concerns need more advanced care options.Some examples of types of eye care include:Vision correction. This is the main approach to treating eyesight issues like nearsightedness, farsightedness or age-related near vision loss. Eyeglasses and contact lenses are the most common options. Some people need prescription glasses or contacts, while others may only need reading glasses (sometimes known as cheaters). Others may choose to undergo vision correction surgery.Medications. Medications can treat many conditions that either directly or indirectly affect your eyes. The type of medication depends on the specific condition(s) involved and other factors. These include medicated drops or ointments you apply to your eyes or medications you take other ways (by mouth, via injection or infusion, etc.).Surgery. Many eye conditions are treatable with surgery. These can include a variety of methods, including phacoemulsification (which uses ultrasound to break up cataracts), cryotherapy (which uses intense cold), radiofrequency ablation (which uses intense heat) and laser surgery.Many other possible treatments can play a role in treating eye conditions or symptoms. Because there are many influencing factors, your eye care specialist or healthcare provider is the best person to tell you more about treatment options. They can explain the options and help you choose one thats most likely to help you.

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