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ANSWER

EYE DEFECTS

1) PRESBYOPIA: This is the loss of ability to focus the eye sharply on near objects as a result of the decreasing elasticity of the lens of the eye. The eye's ability to focus on near and far objects (the power of accommodation) depends upon two forces, the elasticity of the lens of the eye and the action of the ciliary muscle (a roughly ring-shaped muscle that encircles the lens and is attached to it by suspensory ligaments). When the ciliary muscle is relaxed, the ring enlarges away from the lens and the suspensory ligaments are tautened, flattening the lens into a shape suitable for viewing distant objects. When the muscle contracts, the ligaments are loosened, and, because of the elasticity of the lens, the surface of the lens (particularly the front surface), becomes more curved, in keeping with viewing near objects. Ordinarily the lens gradually becomes less elastic (it hardens) with age, so the power of accommodation is lost progressively. The loss is most rapid in the decade of the 40s, the age when most people become aware of difficulty in performing a task, such as reading, that requires near focusing; this can be helped with corrective lenses.

Accommodation may also be lost temporarily as a result of paralysis of the ciliary muscle. With this paralysis, which can occur from the action of certain toxins and medications, the muscle cannot contract, and the surface of the lens is prevented from becoming more convex.

2) GLAUCOMA: This is a disease caused by an increase in pressure within the eye as a result of blockage of the flow of aqueous humour, a watery fluid produced by the ciliary body. (The ciliary body is a ring of tissue directly behind the outer rim of the iris; besides being the source of aqueous humour, it contains the muscle that flattens the curvature of the lens for far vision.) The normal flow of the aqueous humour is from the ciliary body into the posterior chamber, a narrow space bounded in front by the iris, on its outer side by the ciliary body, and in back by the lens and the vitreous body, a jelly-like substance that occupies a major part of the eyeball; from the posterior chamber through the pupil into the anterior chamber, the space in front of the lens and the iris and in back of the transparent window formed by the cornea; and from the anterior chamber through a sieve-like layer of tissue in the lining of the eyeball at the outer periphery of the iris into a circular channel, the canal of Schlemm, from which the aqueous humour flows (by way of vessels called aqueous veins) into blood vessels. Blockage of the aqueous humour flow causes increased pressure in the posterior chamber, and this pressure is transmitted by way of the vitreous to the optic nerve head and the retina. Abnormally high intraocular pressure that is unrelieved causes vision impairment.