

Chapter 1

Medical history

History includes the patient's chief complaints
Table 1, medical illnesses, current medications,
allergies to medications, and family history of
eye disease.

Table 1 Common chief complaints	
Common chief complaints	Causes
Persistent loss of vision	<p>1 Focusing problems are the most common complaints. Everyone eventually needs glasses to attain perfect vision, and fitting lenses occupies half the eye care professional's day. LASIK, used to correct refractive errors, is the number one cosmetic surgery in the USA.</p> <p>2 Cataracts (Fig. 7) are cloudy lenses that commonly occur with aging. Unoperated cataracts are the leading cause of blindness worldwide. In the USA, over 3.5 million cataract extractions are performed each year. It is the number one major surgery in the USA and worldwide.</p> <p>3 Thirteen percent of American adults are treated for diabetes. Another 40% are pre-diabetic. It is the leading cause of blindness in the USA in those under 65 years of age.</p> <p>4 Age-related macular degeneration (AMD) (Fig. 516) causes loss of central vision and is the leading cause of blindness in people over age 65 (Fig 515-517 and 537). Signs are present in 25% of people over age 75, increasing to almost 100% by age 100.</p> <p>5 Glaucoma is a disease of the optic nerve that is usually due to elevated eye pressure. It mostly occurs after age 40; affects 4% of Americans over that age, with black persons affected five times as often as whites. Peripheral vision is lost first, with no symptoms until it is far advanced. This is why routine eye exams are recommended.</p> <p>6 Amblyopia affects 2–3% of children. It is due to improper use of one or both eyes in early childhood and usually resulting from eye turns (strabismus) or uncorrected refractive errors.</p>
Transient loss of vision lasting less than ½ hour, with or without flashing lights	<p>In younger patients, think of migrainous spasm of cerebral arteries. With aging, consider emboli from arteriosclerotic plaques. Simultaneous symptoms in both eyes often direct one to a brain etiology. Dry eye is also the common cause of on–off loss of vision.</p>
Floaters	<p>Almost everyone will at some time see shifting spots due to suspended particles in the normally clear vitreous. They are usually physiologic, but may result from hemorrhage, retinal detachments, or other serious conditions (Figs 556 and 557).</p>

(Continued)

Table 1 (Continued)

Flashes of light (photopsia)	The retina accounts for 84% of complaints, which are usually unilateral. Simple sparks are most often due to vitreous traction on the retina (Figs 562, 568 and 570). Insults to the visual center in the brain (16%) are most often migrainous, but ministrokes, especially in the elderly, must be considered. Cerebral causes are often bilateral, with more formed images, such as zigzag lines. With aging a transient unilateral visual loss often viewed as a curtain coming down (referred to as amaurosis fugax) is most often due to a cholesterol embolus liberated from an arteriosclerotic plaque in the carotid artery (Figs 81, 143, 582 and 584-586). In older individuals transient bilateral blurring of vision is often due to decreased blood flow at the posterior circulation to the brain. A blood clot from the the heart as might occur from atrial fibrillation, a cholesterol embolus or obstruction to flow through vertebral artery in the neck should be considered. A common cause of transient blurring of vision especially in the elderly could be due to dry eye which should be considered before pursuing an extensive vascular workup. It is often associated with a gritty irritated eye relieved by artificial tears and corneal edema noted at the slit lamp (Fig. 248). Another clue to distinguish dry eye from blood flow causes is the sometimes associated neurologic symptoms such as headache, vertigo, muscle numbness or weakness or slurred speech associated with the latter etiology.
Night blindness (nyctalopia)	Nyctalopia usually indicates a need for spectacle change, but also commonly occurs with aging and cataracts. Rarer causes include retinitis pigmentosa and vitamin A deficiency.
Double vision (diplopia)	Strabismus, which affects 4% of the population, is the condition where the eyes do not look in the same direction. This binocular diplopia disappears when one eye is covered. In straight-eyed persons, diplopia is often confused with blurry vision or caused by hysteria or a beam-splitting opacity in one eye that does not disappear by covering the other eye.
Light sensitivity (photophobia) and corneal diseases (Table 9, p. 94)	Usually, a normal condition treated with tinted lenses, but could result from inflammation of the eye or brain; internal reflection of light in lightly pigmented or albinotic eyes (Figs 540-542); or dispersion of light by mucous, lens, and corneal opacities, or retinal degeneration.
Itching	Most often due to allergy, dry eye, and lid margin infections (blepharitis) (Figs 212 and 213).
Headache	Headache patients present daily to rule out eye causes and to seek direction. <ol style="list-style-type: none"> 1 Headache due to blurred vision or eye-muscle imbalance worsens with the use of eyes. 2 Tension causes 80-90% of headaches. They typically worsen with anxiety and are often associated with bilateral temple and neck pain. 3 Migraine often occurs in families and affects in 20% of women and 10% of men. This recurrent pounding headache, often lasting for hours, but less than a day, is sometimes accompanied by nausea, bilateral blurred vision, and flashing, zigzag lights (Fig. 141). It is relieved by sleep and may be aggravated by bright light, stress, and certain foods, especially with nitrates and nitrites (Fig. 141). 4 Sinusitis causes a dull ache about the eyes and occasional tenderness over a sinus (Fig. 223). There may be an associated nasal stuffiness and a history of allergy. 5 Menstrual headaches are cyclical. 6 Sharp ocular pains lasting for seconds are often referred from nerve irritations in the neck, nasal mucosa, or intracranial dura, which, like the eye, are also innervated by the trigeminal nerve (Fig. 108). 7 Headaches that awaken the patient and are prolonged or associated with focal neurologic symptoms should be referred for neurologic study.

Table 1 (Continued)

Visual hallucinations	These most often occur in the elderly, especially in those with dementia, psychosis, or reduced sensory stimulation, as in blindness and deafness. Many medications, including cephalosporins, sulfa drugs, dopamines used to treat Parkinson's disease, vasoconstrictors, or vasodilators should be considered.
Increased tearing (epiphora)	Consider increased production due to emotion and eye irritation or decreased ability of a normally generated tear to drain into the nose. (Fig. 149)

Medical illnesses

Record all systemic diseases. Diabetes and thyroid disease are two that are most commonly associated with eye disease.

Diabetes mellitus

Diabetes may be first diagnosed when there are large changes in spectacle correction causing blurriness. It is due to the effect of blood sugar changes on the lens of the eye.

1 Diabetes is one of the common causes of III, IV, and VI cranial nerve paralysis. It is due to the closure of brainstem vessels. The resulting diplopia may be the first symptom of diabetes and often resolves by 10 weeks.

2 Retinopathy due to microvascular disease (see front and back cover) may result in macular edema. It is the primary reason for blindness before age 65. Patients with diabetes should have annual eye exams, because early treatment is critical. Retinopathy is rare in children before age 15.

Autoimmune (Graves') thyroid disease

This is a condition in which an orbitopathy may be present with hyper- but also hypo- or euthyroid disease.

1 It is the most common cause of bulging eyes, referred to as exophthalmos (proptosis). This is due to fibroblast proliferation and mucopolysaccharide infiltration of the orbit. A small white area of sclera appearing between the lid and upper cornea is diagnostic of thyroid disease 90% of the time (Fig. 1).



Fig 1 Thyroid exophthalmos with exposed sclera at superior limbus, due to bulging eye.

This exposed sclera may be a result of exophthalmos or thyroid lid retraction due to the stimulation of Müller's muscle that elevates the lid. Severe orbitopathy may be treated with radiation, surgical decompression of the orbit (Fig. 3), or by administering steroids orally, intravenously, or by injection into the orbit. In January 2020, the FDA approved the human monoclonal antibody, teprotumumab, to treat proptosis, strabismus, and compressive optic neuropathy from thyroid eye disease. It reduced proptosis by more than 2 mm in 71–83% of patients.

2 Infiltration of eye muscles may cause diplopia, which is confirmed by a computed tomography (CT) scan (Figs 2 and 3).

3 Exophthalmos may cause excessive exposure of the eye in the day and an inability to close the lids at night (lagophthalmos), resulting in corneal desiccation.

4 Optic nerve compression is the worst complication and occurs in 4% of patients with thyroid disease. It could cause permanent loss of vision (Fig. 2) and immediate intravenous steroids should be considered when vision is threatened.

Medications (ocular side effects)

Record patient medications. Those taking the following commonly prescribed drugs are often referred to an eye doctor to monitor ocular side effects.

Hydroxychloroquine (Plaquenil), initially used to treat malaria, is now a cornerstone medication used to treat autoimmune diseases, such as rheumatoid arthritis, lupus erythematosus, and Sjögren's syndrome. It may cause retinal maculopathy with pigment changes resembling a "bull's eye" (Fig. 4). Patients should get a baseline eye exam before starting medication. It includes visual acuity, Amsler grid, color vision, and examination of the retina to rule out preexisting maculopathy. The patient should follow up every 6 months. Depending on the dosage and the chronicity of use, the eye doctor will determine if additional tests are necessary. Risk increases

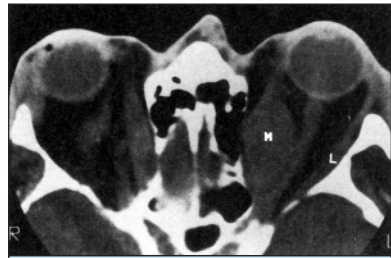


Fig 2 CT scan of thyroid orbitopathy showing fluid infiltration of the medial rectus muscle (M) and normal lateral rectus muscle (L) and proptosis. Compression of left optic nerve could cause optic neuropathy. This is called *crowded apex syndrome*. Source: Courtesy of Jack Rootman.



Fig 3 Orbital CT scan of Graves' orbitopathy before surgical decompression (above) and right orbital floor osteotomy (below). Often three, but rarely all four, bony walls may be opened. Note thickened extra ocular muscles. Source: Courtesy of Lelio Baldeschi, MD, and *Ophthalmology*, July 2007, Vol. 114, pp. 1395–1402.

if dosage exceeds 5 mg/kg. Toxicity is also related to the cumulative amount of the drug with 1% occurrence in the first 5 years and 2% after 10 years and if there is coexisting macular degeneration. These high-dose chronically treated patients may also have routine monitoring of their visual fields and optical coherence tomography (OCT) testing (Figs 463 and 464).

The retina is also adversely affected by phenothiazine tranquilizers (Fig. 5); niacin, a lipid-lowering agent and interferon, used to treat multiple sclerosis and hepatitis C (Figs 6–8).

Ethambutol, rifampin, isoniazid, and streptomycin—taken mainly for tuberculosis—may all cause optic neuropathy. The antidepressants Paxil, Prozac, and Zoloft may also cause optic neuropathy. Corticosteroids may cause posterior subcapsular cataracts (Fig. 429), glaucoma, and a reduction in immunity that may increase the incidence of herpes virus and other infections.

Flomax (tamsulosin), the most common treatment for an enlarged prostate gland, increases the complications in cataract surgery by decreasing the ability to dilate the pupil, a condition referred to as intraoperative floppy iris syndrome (IFIS). Pupillary

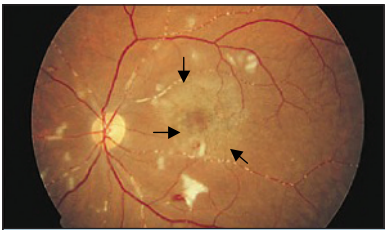


Fig 4 Bull's eye maculopathy due to hydroxychloroquine in a patient with systemic lupus. The vasculitis and white cotton-wool spots are due to lupus. *Source:* Courtesy of Russel Rand, MD, and *Arch. Ophthalmol.*, Apr. 2000, Vol. 118, pp. 588–589. Copyright 2000, American Medical Association. All rights reserved.



Fig 5 Phenothiazine maculopathy with pigment mottling of the macula.

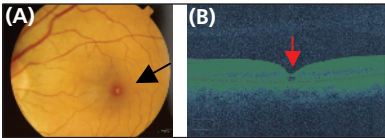


Fig 6 Tamoxifen maculopathy with crystalline deposits (A); and (B) OCT showing crystals in the fovea. *Source:* Courtesy of Joao Liporaci, MD.

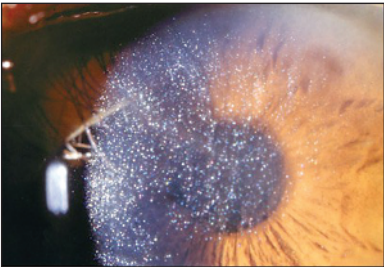


Fig 8 Besides causing maculopathy and cataracts, tamoxifen also causes crystal deposition in the cornea (keratopathy). *Source:* Courtesy of Olga Zinchuk, MD, and *Arch. Ophthalmol.*, July 2006, Vol. 124, p. 1046. Copyright 2006, American Medical Association. All rights reserved.

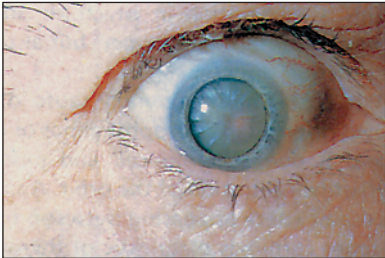


Fig 7 Tamoxifen causes cataracts.

expansion devices (Fig. 9) and additional pupillary dilating medications usually prevent complications.

Stevens–Johnson syndrome (Fig. 10) is an immunologic reaction to a foreign substance, usually drugs, and most commonly sulfonamides, barbiturates, and penicillin. Some 100 other medications have also been implicated. It often affects the skin and mucous membranes. It could be fatal in 35% of cases.

Prostaglandin analogues are the most commonly prescribed glaucoma medications. Side effects include rare, irreversible darkening of the iris (Fig. 11) and reversible reduction in orbital fat (Fig. 12) with frequent darkening and lengthening of the lashes (Fig. 13). The lash changes are often considered desirable by patients and, consequently, lead to another prostaglandin medication called *Latisse*, which is specifically prescribed for cosmetic reasons to alter the lashes.

Amiodarone (Cordarone, Pacerone), one of the most potent anti-arrhythmia drugs, and sildenafil (Viagra), tadalafil (Cialis), and vardenafil (Levitra), used to treat erectile dysfunction, have all been suspected of causing nonarteritic anterior ischemic optic neuropathy. Amiodarone almost always causes deposits in the cornea that rarely reduce vision, but may cause glare (Fig. 14).

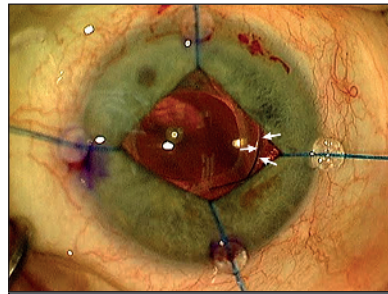


Fig 9 Iris retractors are one method used to open poorly dilated pupils during cataract surgery. Note edge of lens implant (t) behind iris. Source: Courtesy of Bonnie Henderson, MD, Harvard Medical School.

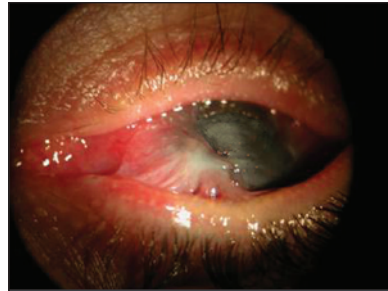


Fig 10 Stevens–Johnson syndrome with inflammation and adhesions of lid and bulbar conjunctiva. Source: Reprinted with permission from *Am. J. Ophthalmol.*, Aug. 2008, Vol. 1146, p. 271. Surgical strategies for fornix reconstruction. Based on *Symblepharon Severity*, Ahmad Kheirhah, Gabriella Blanco, Victoria Casas, Yasutaka Hayashida, Vadrecu K. Radu, Scheffer C.G. Tseng. Copyright 2008, Elsevier.

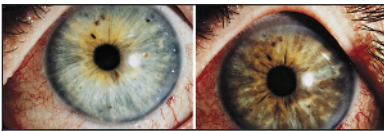


Fig 11 Irreversible darkening of a blue iris after 3 months of latanoprost (Xalatan) therapy. This is the most common drug for treating glaucoma. Source: Courtesy of N. Pfeiffer, MD, P. Appleton, MD, and *Arch. Ophthalmol.*, Feb. 2011, Vol. 119, p. 191. Copyright 2001, American Medical Association. All rights reserved.

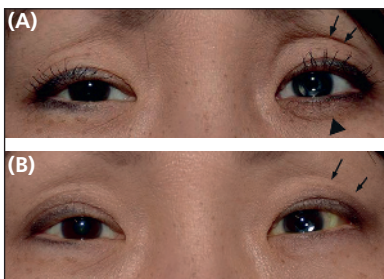


Fig 12 (A) Prostaglandin-analogue induced fat atrophy of the left orbit with sunken superior sulcus after 1 year (†) and darkened skin (•). Courtesy of University of Iowa, Eyerounds.org. (B) After discontinuing eye drops that had been used in the left eye for 1 year, orbital fat atrophy, darkened and lengthened lashes, and improved skin pigmentation are seen. *Source:* Courtesy of N. Pfeiffer, MD, P. Appleton, MD, and *Arch. Ophthalmol.*, Feb. 2011, Vol. 119, p. 191. Copyright 2001, American Medical Association. All rights reserved.

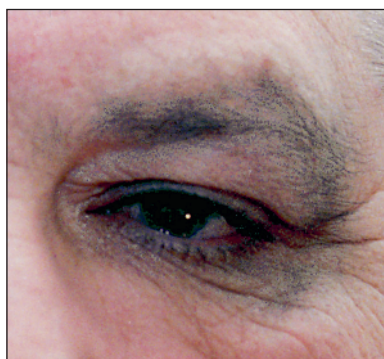


Fig 13 After long-term use of prostaglandin analogue in the left eye, the patient developed hyperpigmentation of periorbital skin, darkening and lengthening of lashes, and loss of orbital fat, causing a deepening of the upper eyelid sulcus.

Topiramate (Topamax), used to treat seizures and prevent migraine headaches, may cause angle-closure glaucoma by causing edema of the ciliary body which pushes the iris toward the cornea closing the drainage system. Immediately discontinue the drug.

Allergies to medications

Inquire about drug allergies before eye drops are placed or medications prescribed. Neomycin, a popular antibiotic eye drop, may cause conjunctivitis and reddened skin (Fig. 15).

Family history of eye disease

Cataracts, refractive errors, retinal degeneration, and strabismus—to name a few—may all be inherited. In glaucoma, family members have a 10% chance of acquiring the disease.

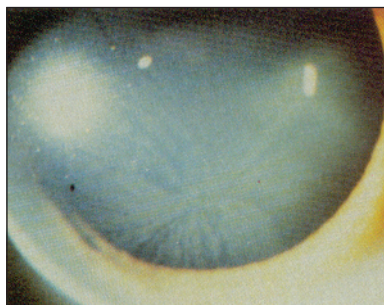


Fig 14 Epithelial deposits radiating from a central point in the inferior cornea. They occur in almost all patients with Fabry's disease, which is an X-linked systemic accumulation of a glycosphingolipid. Easily seen on a slit lamp exam, it can be the first clue in recognizing the presence of this disease, which is amenable to therapy. Indistinguishable deposits eventually appear in almost all patients using amiodarone and, less often, with hydroxychloroquine. *Source:* Courtesy of Neal A. Sher, MD, and *Arch. Ophthalmol.*, Aug. 1979, Vol. 97, pp. 671–676. Copyright 1979. American Medical Association. All rights reserved.

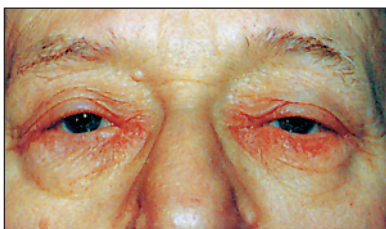


Fig 15 Neomycin allergy occurs in 5–10% of the population.

Eighty-five percent of people with migraine have an immediate relative with the disease.

A special question should be directed to a healthy lifestyle. It has been steadily worsening, causing a decrease in American lifespan to 78.6 years in 2017, compared with 82 years in Canada, Japan, and France. Fourteen percent of Americans still smoke cigarettes. It doubles the rate of cataracts, macular degeneration, and all types of uveitis. It also worsens exophthalmos due to thyroid disease, and was responsible for 480,000 deaths in America in 2018. Care must be taken in prescribing pain medications. In 2017, opioid use was the number one cause of death in America in those younger than age 50. At age 70, 80% of Americans have been diagnosed with high blood pressure. Over 50% of adults are diabetic or pre-diabetic. One-third of Americans are obese and another one-third are overweight, contributing to cancer, hypertension, and diabetes. Patients should be reminded about minimizing the consumption of red and preserved meats, salt, sugar, and saturated fats. Recommend instead an antioxidant diet rich in fruits, vegetables, beans, nuts, fish, and whole-grain cereals. Staying thin, minimizing stress, and following a routine daily exercise program should also be advocated, since even sitting at your job has been shown to shorten life span by 2 years. Mental disorders must be properly addressed since suicide, drug addiction, and alcoholism contribute significantly to morbidity. Remind patients that they must be proactive in taking responsibility for their health, and that they must become less dependent on pharmaceutical answers.