
COLOR ATLAS

of Anterior Segment Eye Diseases

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PREFACE

The adage "One picture is better than a thousand words" is especially applicable to the practice of medicine, and, particularly, to the practice of ophthalmology. The details of rare and unusual pathologic conditions as well as of the progress made during therapy can be preserved through photographs, which can be used not only to inform and reassure the patients involved but also to teach medical students and physicians. Further, other patients with similar conditions can be given reassurance through visual evidence of past experience with these conditions.

Illustrated in this atlas are conditions most frequently observed in practice and some cases of rare diseases. Symptoms and therapy are not discussed, but lesions are described briefly. The physician might find it especially challenging to attempt a differential diagnosis on the basis of the clinical picture in cases where the diagnosis is equivocal.

Except for thirteen donated photographs, all the Kodachrome pictures were taken by the author, by a photographic technique developed in 1953 and improved in 1955 and 1962. These techniques were described by the author in the following articles: "Photography of the External Eye: A Simple, Inexpensive Technique" [*Am. J. Ophthalm.*, 36(3):386-388, 1953]; "Anterior Segment Photography: A Simple, Inexpensive Technique. Additional Report" [*Am. J. Ophthalm.*, 2:39(2):225-231, 1955]; and "Anterior Segment Photography. Additional Report" [*Am. J. Ophthalm.*, 53(6):1012-1013, 1962]. The films were processed by Eastman-Kodak.

The reader should not confuse the light reflex with the disease entity; the white single or double round spot found on all photographs is the reflex from either the fixation light or the strobe flash light. The tannish grey cast visible near the inner canthus and extending onto the bulbar conjunctiva and cornea on several of the uniocular photographs is the reflection of the strobe light from the

nose and should not be interpreted as an aspect of the pathologic condition.

This atlas was prepared in response to numerous requests from physicians, medical students, and allied personnel for a permanent version of the photographs in the exhibit "Know Your Eyes," which was first shown at a meeting of the Ohio State Medical Association in April, 1961, where it won a first-place Gold Award for Teaching.

The use of the legends "What's the diagnosis?" or "Diagnose actual cases" and a flip tab for diagnosis with each photograph was originally used in this exhibit. The exhibit has since been expanded and has been shown at meetings of several national, state, and local medical societies throughout the United States.

I am grateful to my father, Ira A. Abrahamson, Sr., M.D., for his valuable counsel in ophthalmology, and to my dear wife Linda for her support and cooperation during the preparation of this book.

I acknowledge with gratitude selected illustrations graciously made available by the following colleagues: Ira A. Abrahamson, Sr., Crowell Beard, A. E. Duggan, Jerome A. Gans, Dan Gordon, Margaret A. Halle, and William Rosenthal.

Appreciation is expressed to Carroll Weiss for his technical guidance in the selection and organization of the photographs.

IRA A. ABRAHAMSON, JR.

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1

LIDS AND ADNEXA

The most common lesions affecting the lids and adnexa are usually the result of an inflammatory process. Various types of blepharodermatitis, as seen in Plates 1 to 3, may be present, producing redness and swelling of the lids and conjunctiva, which may be accompanied by scales or crusts on the lashes. Swelling of the lids alone, without redness, may be the result of a local allergic reaction, as may occur following the use of miotics (Plate 1-5) or following a systemic disease, e.g., kidney disease, producing edema of the lower lids (Plate 4-6), or with angioneurotic edema as seen in Plate 8-5, or scleredema, in Plate 8-6. Swelling of the lids also could accompany an inflammation such as cellulitis (Plates 4-4 and 4-5) or occur with poison ivy (Plate 3-5) or an abscess (Plate 6-3).

Various forms of dermatosis may involve the lids and adnexa: atopic dermatitis (Plates 4-2 and 4-3), seborrheic dermatitis (Plate 5-2), psoriasis (Plate 8-3), molluscum contagiosum (Plate 8-4), various forms of herpes zoster ophthalmicus (Plates 5 and 6), and ocular pemphigus (Plates 6-4 to 7-1). In this last condition scarring as well as vascularization of the cornea may occur, followed by symblepharon, or adhesions between the eyeball and the lids. Virus lesions such as vaccinia (Plate 7-4), chickenpox (Plate 7-5), and herpes simplex (Plate 7-6) occasionally involve the lids.

Drug reactions, such as those which might develop after systemic ingestion of potassium iodide (Plate 7-3), or a sensitivity to the use of systemic penicillin (Plate 8-1), producing severe bilateral blepharokeratoconjunctivitis with loss of eyelashes, or sensitivity to topical atropine (Plate 8-2) may produce serious local eye disturbances. Other dermatologic lesions, such as Boeck's sarcoid (Plates 14-1 and 14-2), and Vogt-Koyanagi-Harada syndrome (Plates 14-3 and 14-4), in which alopecia, poliosis, and vitiligo are present, may involve not only the skin of the lids and adnexa, but also the uveal tract, in the form of uveitis.

Various types of sebaceous cysts, papillomas, and nevi may

affect the skin on the upper or lower lids, as seen in Plates 14-5 to 16. Xanthelasma, as illustrated in Plate 17, are orangish-yellow, slightly elevated benign tumors of the skin, usually located on the upper or lower eyelids and are frequently associated with diabetes or hypercholesterolemia.

Ingestion of large quantities of vitamin A in the form of carrot juice or carrots themselves may produce hypercarotenemia,¹ or carotenoderma. There is an orangish-yellow discoloration of the skin of the face, palms of the hands, and soles of the feet, but the sclera itself remains white, differentiating this condition from hepatic jaundice, as may be noted in Plates 11-1 to 11-3. Another discoloration of the bulbar and palpebral conjunctiva and skin results from the use of argyrol as drops instilled in eyes or for washing out sinuses. The drug is absorbed by the tissues and stains them a purplish-silver color, as seen in Plates 11-4 to 11-6 and Plates 111-4 to 111-6.

An infection of the root of the hair follicles along the lid margin is called a hordeolum, or sty, and is sometimes confused with an infected chalazion. A chalazion results from the obstruction of the duct of the Meibomian gland, and when accompanied by a secondary infection it is called an infected chalazion. These lesions are seen in Plates 9 and 10. In the chronic form a chalazion usually forms a lump on the upper or lower lid as in Plates 10-5 and 10-6.

Hemangioma of the eyelid when present in a child may be associated with the Sturge-Weber syndrome (Plate 112-4); however, it can occur as a congenital defect without the syndrome, as seen in Plate 12. Spider hemangioma can be blanched by pressing the center of the vessel with an object as shown in Plates 12-5 and 12-6.

Various conditions and diseases of the cilia, or eyelashes, are seen in Plate 13: lack of pigment in an albino, whose lashes are white; distichiasis, where the lashes grow in separate rows along the lid margin; trichiasis, where the lashes turn inward, often rubbing against the cornea; poliosis, a premature whitening of the lashes which often occurs during sympathetic iridocyclitis and trigeminal neuralgia; and the absence of lashes.

Nodular masses around the outer or inner canthus of the lids or nose may vary from dermoid (Plate 18-1) or sebaceous cysts (Plates 18-2 to 18-4) to an acute inflammatory process such as a dacryocystitis (Plates 18-6, 19-1, and 19-2). A tumor of the ethmoid sinus, called cylindroma, may invade the lacrimal sac, as seen in Plate 18-5, and create a differential diagnostic problem. A technique for performing dacryocystorhinostomy with wire fistulization^{2,3} to correct obstruction of the nasal lacrimal duct is shown in Plates 19-3 and 19-4. A chronic case of dacryocystitis which resulted from injury to the nasal lacrimal duct in an automobile accident is seen in Plates 19-5 and 19-6.

Aging processes may affect the lids in the form of varicose veins on the lower lid (Plate 20-1) or blepharochalasis. In this latter condition, illustrated in Plates 20-2 through 20-4, there is a laxity of the skin of the upper and lower lid which may interfere with vision. This defect can be corrected by plastic surgery; the excellent cosmetic results are seen in Plates 20-5 and 20-6.

Various forms of skin cancer of the lids are quite common and some of these are shown in Plates 21 through 23, with examples of their surgical cure.

Senile spastic ectropion, or eversion of the lid, may develop in an elderly individual. Also, the lower lid may turn out because of cicatricial ectropion resulting from scar tissue caused by disease or trauma (burn). Examples of these conditions are seen in Plate 24. However, space does not permit postoperative follow-up, although the slides are available.

On the other hand, inversion of the lids, called entropion, may occur (Plate 25), usually on a senile spastic basis. Here the lid turns in and the lashes scratch the cornea. This is also corrected surgically, as illustrated in Plates 25-3 to 25-6. Occasionally the lid may also invert because of a malignant lid lesion, as seen in Plate 22-1.

Drooping of the upper lid may present a differential diagnostic problem. If present from birth, the condition is called congenital ptosis (Plates 26-1 and 26-2). It might be the result of an inflammation of the tarsus (Plate 26-3), or may have developed following a stroke (Plate 26-4), or may be associated with myasthenia gravis

(Plates 26-5 and 26-6). Diagnosis of the various forms of ptosis, both acquired and congenital, is made from the history and clinical findings.

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2

TRAUMA

By far the most common injury to the eye results from the presence of a foreign body,¹⁻³ which may either lodge in the conjunctiva or become imbedded in the cornea. Different types of corneal foreign bodies are seen in Plates 27 and 28. A rust ring may be present with the foreign body (Plates 28-3 and 28-4), and must also be removed.

After removal of a corneal foreign body, a corneal ulcer may develop as a complication (Plates 28-4 to 28-6). Injuries to the cornea as a result of blast injury or chemical burn, such as from hair dye, lye, lime, battery acid, etc., may damage the cornea and produce corneal abrasions or ulcers. These are easily visible in Plates 29 and 30 as green lesions, stained by a technique using fluorescein dye preparation.⁴ More serious burns of the face and eyelids in a patient who had fallen into a furnace are shown in Plates 31-1 and 31-2.

Blows to the lids and eyes may produce a hematoma (Plate 31-3), and a skull fracture may produce bilateral ecchymosis of the lids (Plate 31-4). A direct blow to the eye by a baseball, fist, or rock can produce contusions of the eye and adnexa as seen in Plates 31-5 and 70-3. Lacerations of the globe (Plate 70-4) and of the lid may involve the canaliculus (Plate 31-6) or the lid itself, as seen in Plate 32 before and after surgery.

Hemorrhages in the skin or under the conjunctiva (Plates 33 and 34) may follow trauma or be produced by sudden increased blood pressure in the eye as may occur with episodes of coughing, sneezing, vomiting, or strangulation. Blows to the eye may be severe enough to cause hemorrhages into the eye itself. When a hemorrhage occurs in the anterior chamber, it is called hyphema (Plate 34). If the intraocular pressure is elevated over a long period of time, bloodstaining of the cornea may result (Plates 35-1 and 35-2). Another complication may be an iridodialysis in which the iris is torn away from the ciliary body (Plate 34-3).

Other injuries to the eye may produce lacerations of the cornea

and even iris prolapse through a lacerated cornea (Plate 35).⁵ Injuries to the eye should make one suspect other complications, such as traumatic cataracts, as exhibited in Plates 36 to 38, or ruptured choroid or retina. Luxation or subluxation of the lens may occur with trauma where the lens is dislocated either backward into the posterior chamber or forward into the anterior chamber (Plate 38), or through an opening in the sclera to lodge under the conjunctiva (Plate 38-6).

Thus when one sees an injury to the eye, one should look for the most serious complication.

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3

MUSCLES

The three main types of permanent muscle imbalance are exotropia, esotropia, and hypertropia. In the illustrations, the mechanical displacement of one eye with reference to the position of the other can be recognized by observing the position of the light reflex hitting the cornea or by noticing the amount of sclera present between the limbus and the inner canthus of each eye.

The condition in which the eyes turn outward is called exotropia, external strabismus, external squint, or walleye. This may be of a constant or an alternating type. In the latter, one eye looks straight as the other eye turns out, and then as the eyes alternate fixation, the other eye may turn out as the fellow eye fixes. These eyes are straightened surgically in children and adults as seen in Plates 39 and 40.

Frequently the individual with this type of muscle imbalance does not alternate but has a unilateral constant exotropia. In adults the condition usually exists with an amblyopic eye, and the surgical correction is purely cosmetic. Plate 41 shows this condition, before and after surgery.

In children the most common type of muscle imbalance encountered is esotropia, internal strabismus, internal squint or cross-eye. Frequently, prominent epicanthal skin folds give the appearance of cross-eye, as seen in Plate 42-1. However, as seen in Plate 42-2, an internal squint may also exist with prominent epicanthal folds. Often this type of strabismus can be corrected by glasses alone and does not require surgery, when it is termed accommodative esotropia, shown in Plates 42-3 to 42-6.

Other forms of esotropia are severe and require surgical correction as seen in Plate 43. Esotropia also exists in adults, but the eye is usually amblyopic and surgical correction is mainly cosmetic, as seen in Plate 44.

Another form of strabismus is hypertropia, in which the eye is

turned upward as compared with the fixing eye. When the individual alternates, the other eye turns downward, which is called hypotropia (Plates 47-1 and 47-2).

Various syndromes with muscle anomalies may occur. A Duane retraction syndrome is characterized by enophthalmos, narrowing of the palpebral fissure, and a pulling or sinking of the affected eye into the orbit on nasal gaze (looking toward the nose) as compared with external gaze (looking away from the nose). Plate 45 illustrates this condition in a child and in an adult.

Muscle weaknesses may occur with exophthalmos in thyroid disease, as noted in Plate 47. Here, the eyes are proptosed, or bulging outward (exophthalmos), the gaze is staring in nature, there is lag in lid response on downward gaze, and there is infrequent blinking. The degree of proptosis can easily be measured with an exophthalmometer. An eye may be displaced as a result of a spontaneous or traumatic intracranial hemorrhage with the consequent paralysis of an extraocular muscle as illustrated in Plate 46.

Other intracranial lesions may affect the eye muscles or produce exophthalmos. One example presented in Plate 48 is the result of a carotid sinus-cavernous sinus (carotid-cavernous fistula) syndrome ¹ that produced proptosis with exposure keratitis; the condition before surgery and the results following ligation of the common carotid artery are shown. Another example is an aneurysm of the internal carotid artery which can produce an acute internal and external ophthalmoplegia ² with involvement of cranial nerves III, IV, V, and occasionally VI, as seen in Plates 48-5 and 48-6.

From the preceding one can see the importance of the study and evaluation of muscle balance in the establishment of a diagnosis.

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4

ORBIT

Various bone and eye anomalies may be observed in connection with the orbit. Bulging forward of the frontal bones from exostosis as seen in Plates 49-1 and 49-2 may exist, giving the appearance of enophthalmos and narrowed palpebral fissures. Another congenital anomaly having enophthalmos and narrowed palpebral fissures also exhibits microcornea and congenital cataracts, as seen in Plates 49-3 through 49-5.

On the other hand, a widened palpebral fissure may exist following an injury (Plate 49-6). Injuries may also produce just the opposite effect by depression of the frontal bone, as seen in Plates 50-1 and 50-2. Another orbital injury occurred after an arrow had lodged in the orbit of an individual.¹

Surgery on the frontal or ethmoid sinus may also produce a depression of the orbital roof (Plate 50-3). Paralysis of cranial nerve VII can produce a typical Bell's palsy, as seen in Plates 50-4 to 50-6, with facial weakness on the affected side.

Lesions of the orbit may exist as a result of retrobulbar hemorrhage (Plate 51-1), causing proptosis and swelling of the lids. An orbital cellulitis secondary to an ethmoiditis (Plate 52-1) or acute tenonitis (Plate 51-4) may also produce these findings. A retrobulbar pseudo tumor (Plates 51-5 and 51-6) may cause proptosis and bulging conjunctiva;² and edema and granulation tissue in an anophthalmic socket following ligation of the internal carotid artery as seen in Plate 51-2, as well as edema with granulation tissue as a result of metastatic carcinoma of the prostate (Plate 52-2) may be included in the differential diagnosis.

Fatty tumor masses in the lower lid or in the external canthus may be present in the form of lymphomas or dermolipomas as seen in Plate 52 and can easily be removed surgically.

The eyeball may undergo degeneration in which it becomes shriveled up after severe injury or inflammation has produced phthisis bulbi, as seen in Plate 53. Such an eye may require enu-

cleation for pathological study or for cosmetic improvement. The appearance of the empty socket with sutures and conformer in place is shown in Plates 53-5 and 53-6.

Plate 54 illustrates sequence shots of a blind eye with phthisis-bulbi and band dystrophy: before surgery, following enucleation, and the final result with the prosthesis in place. Photographs with and without the prosthesis are seen in Plates 55-1 and 55-2. A malignant lesion involving the orbit is the neurofibrosarcoma (Plate 55), which usually requires complete exenteration of the orbit in order to save the patient's life. Plastic surgical repair with skin grafting is then needed to help fill the empty socket, as seen in Plate 55-6. Later on, an artificial eye and conformer may be fitted into the socket, providing a good cosmetic result.

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