GIFFORD'S TEXTBOOK OF OPHTHALMOLOGY

By

FRANCIS H. ADLER, M.D.

Professor of Ophthalmology, University of Pennsylvania Medical School

FOURTH EDITION, ILLUSTRATED

W. B. SAUNDERS COMPANY

Philadelphia and London

Reprinted May, 1948, July, 1950, and November, 1951

MADE IN U. S. A.

PRESS OF
W. B. SAUNDERS COMPANY
PHILADELPHIA

PREFACE TO THE FOURTH EDITION

THIS revision of Dr. Sanford Gifford's text has been made to carry out the original purpose of the book. He was impressed with the need of a Text on Ophthalmology which would be of value to the medical student and to the physician not specializing in ophthalmology. He realized that the usual texts gave too much specialized knowledge which would never be used by the general physician, and too little to enable him to treat adequately those patients who regularly come to him before seeing a specialist.

Changing trends in medical education have made it imperative to reevaluate what the medical student should be taught. He should not be asked to study the details and the technics of a specialty for which he will have no use in his later work. The problem of the undergraduate teacher, therefore, is to select that material which will be of practical use to the student after his graduation. All medical educators are agreed that several years of post-graduate study are essential for any physician who intends to practice a specialty.

Ophthalmology is a valuable subject for every physician, no matter in what field he is engaged, and more than any other specialty, with the possible exceptions of pediatrics and psychiatry, will be of use to him in all branches of medicine. No excuse is needed for presenting a well-organized course in ophthalmology in the medical curriculum, provided the material is carefully selected with the students' future needs in view.

An endeavor has been made in this edition to present only that part of the subject which every physician will find of value. The material has necessarily been developed beyond the immediate needs of the medical student, but should be useful as a working basis for a course in the medical school and as a reference book for the later years of practice.

The technics of refraction and operations have been condensed considerably for reasons previously given. An orientation in various surgical procedures is given in a separate chapter, which can be referred to when needed without interrupting the subject under discussion. Special emphasis has been laid upon the relation of the eye to general medical and neurological conditions. An effort has been made to acquaint the physician and medical student with those diseases of the eye which he may safely treat himself; with the details

of the treatment; and the indications, in others, which should prompt him to direct the patient to seek more expert advice.

References are given to articles in current literature in English, which will serve as a guide to further reading and amplification of knowledge. No attempt has been made to make these references complete, and only those were selected which the author felt would serve as a general review of the subject.

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Chapter 1

EXTERNAL EXAMINATION OF EYES AND ADNEXA

EVERY physician should be able to carry out a routine external examination of the eyes without the use of any special apparatus, and derive information of value for the diagnosis and treatment of his patients. To the discerning doctor, the patient's general expression, in no small manner determined by the eyes and their adnexa, indicates his general state of health and happiness, and occasionally something abnormal in the lids or the anterior segment of the eyeballs may be the clue to some particular disease. Thus, one is frequently led to a diagnosis by such findings as the exophthalmos of Graves' disease, ptosis of myasthenia gravis, nystagmus in multiple sclerosis and encephalitis, the Argyll Robertson pupil in tabes, and so on.

If a certain routine is followed in examining every patient, one will avoid overlooking signs of disease or injury which might otherwise escape notice. It is obvious that one must first learn what is normal in order to detect abnormalities, but this can soon be acquired if a routine is strictly adhered to in examining every case. Although at first such a comprehensive examination must consume time, this will rapidly be cut down as the experienced eye learns to take in at a glance what at first required careful scrutiny. Such a routine examination is outlined in this chapter.

EYELIDS AND PALPEBRAL FISSURES

In a good diffuse light, preferably daylight, one should note the general appearance of the eyelids—their color, texture, swelling, position and motility (Fig. 1). Localized tumefactions may be either seen or felt by palpation. Any signs of inflammation or the presence of non-inflammatory edema should be noted. The texture of the skin should be observed; whether this is unusually thin or redundant, or thickened and scaly, or covered with desquamated epithelium. The presence of vesicles should likewise be detected.

The size and position of the palpebral fissures should be observed; whether they are equal and whether they show any abnormal change in size on movement of the eyeballs. Finally, the character of the involuntary blinking, whether abnormally frequent or absent, should be determined and the extent of the voluntary lid closure and opening.

Can the patient close both eyes tight on command and do both lids move upward equally well when the patient is requested to look upward? Are the lid borders in close apposition to the globes, or is a portion of either eyelid everted, so that the conjunctival surface is exposed? Is the lid border inverted so that the lashes are turned in

Fig. 1. Normal eyelids and adnexa. Note position of upper lid at edge of pupil, lower lid just below limbus. Also note highlight just off center of pupil.

against the cornea? Is the amount of skin between the two fissures and covering the bridge of the nose normal in amount and texture, or is it excessive?

LASHES AND EYEBROWS

The number, size and color of the hairs forming the brows and lashes should be observed and the direction of the eyelashes noted particularly—i.e., whether they are turned in or out, or misdirected in any direction. There may be a patchy loss of lashes, or some newformed or stunted lashes, or even a localized patch of abnormally colored lashes, for example white. Careful scrutiny of the lash border should be made, noting any scales due to secretion or even animal parasites.

POSITION OF THE EYEBALLS

There is a very wide range in the prominence of the eyeballs in normal individuals and caution should be observed in deciding that both eyes are either abnormally prominent or sunken in the orbital cavity. A displacement of more than 1.5 mm. of one eye in front of the fellow eye is definitely abnormal, but this can only be determined by instrumental measurement. Unless the difference is so marked that there is no question about it, it is safer not to rely on naked eye observation for the diagnosis of exophthalmos or enophthalmos. Many times an eye appears to be prominent in the orbit because the palpebral fissure is wider on that side than on the opposite. This frequently gives

rise to a false diagnosis of exophthalmos, or at least to a false impression of the degree of exophthalmos. This will be discussed in greater detail in the section on exophthalmic goiter (page 138).

When the patient is looking straight ahead of him towards the horizon, the two eyes should be on the same level and the visual axes apparently parallel. In a general way, this can be determined by observing the location of the reflection of a window or a light on the cornea of each eye, noting particularly where it lies in respect to the edge of the pupil (see Fig. 1). If the reflex lies in the same position in each eye, one can be reasonably sure that the eyeballs are in straight alignment. A still more accurate method of determining this is to have the patient fix a distant object and then to place a cover over the right eye while observing the left carefully to note any slight movement of this eye. If the left eye shows not the slightest movement when the right is covered, one can be certain that this eye is in proper alignment. The cover is then removed from the right eye and at least a second or two allowed to elapse while the patient is again told to keep looking at the same distant object. The cover is now placed over the left eye, while the examiner watches the right eye for any movement. If this eye also fails to show any movement when the left eye is covered, it can be said that this eye also is in proper alignment. This test is more accurate than judging the position of the eye by the corneal reflexes, because the cornea is not a perfect sphere but an ellipsoid with its major axis frequently not corresponding with the visual line. Hence, the reflex may lie inside or outside the center of the pupil when the patient is looking straight ahead in the distance, even though the eyes are in good alignment. This will give rise to the impression that the eyes are either divergent or convergent.

MOTILITY OF THE EYEBALLS

The extent to which each globe can be turned in the cardinal directions should be determined, and care taken to note whether the two eyes move together. Normally, the eyes are in alignment on looking straight ahead and slightly below the horizon. They can be moved throughout a wide angular range in all directions. No involuntary movement of the eyes should occur under these conditions, except in the extremes of gaze, when a nystagmus (see p. 73) may be found (end-position nystagmus). Special attention should be paid not to overlook a fine nystagmus. Occasionally, fine rotational nystagmus will escape observation until the fundus is examined with the ophthalmoscope.

The convergence near-point should be determined; this is the point closest to the patient up to which both eyes can converge on an object brought up towards him. As soon as one eye begins to deviate outward, the limit of the convergence has been reached. This is the convergence near-point.

LACRIMAL APPARATUS

The surface of the cornea and the conjunctiva is kept moist by the tears and the secretion of the glands lining the lids. It should be noted whether there is any lack of this fluid, or whether the tears are present in excess. The latter may be due either to excessive formation of tears or to some obstruction in the passages which normally drain them away from the eye. The position of the lacrimal puncta and their size should be observed and pressure over the lacrimal sac made to determine whether this contains any secretion or pus. The presence of any fluid in the sac on pressure is an indication that the tear duct is blocked. The character of the fluid will then indicate whether the sac is infected or not.

CONJUNCTIVA

Bulbar Conjunctiva. The bulbar conjunctiva is now examined while the lids are held gently apart and before any manipulation is carried out which might produce congestion of the conjunctival vessels. A few vessels are usually visible on the normal conjunctiva and not uncommonly these are large, tortuous episcleral vessels. In some people, their presence is annoying, since they make the eyes look abnormally congested. One should become familiar with the common normal variations to avoid the mistake of calling such vessels pathologic. Except for these larger vessels and occasional depositions of pigment, the sclera should be a porcelain white color as seen through the bulbar conjunctiva (see p. 251). Pathologic congestion of the bulbar conjunctiva should be recognized at once. Two forms of pathologic congestion occur.

Superficial Congestion (*Fig. 2*). This occurs when any irritation of the conjunctiva is present, such as a foreign body on the eyelid or a bacterial or traumatic conjunctivitis. Only the superficial layer of vessels is involved. These vessels are tortuous, have a bright brick-red color and are more evident at the periphery of the bulbar conjunctiva in the fornices than near the limbus. The small capillaries between the large vessels visible to the naked eye may be engorged if the congestion is marked, giving a diffuse redness to the whole conjunctiva, and petechial hemorrhages may be present. This is the form of congestion which gives rise to the lay term "pink eye," nearly always due to an acute infection of the conjunctiva (p. 208).

Deep Congestion (*Fig. 128*). This always indicates an involvement of the deeper structures of the eye or of the cornea. It is seen in iritis and keratitis. It may be present when a foreign body is imbedded in the cornea, when it signifies that the irritation of the eye is sufficiently severe to dilate the vessels supplying the iris and ciliary body. This form of congestion is to be looked for immediately around the limbus.

The individual vessels in this region are too small to be seen as such by the naked eye, but there will be a diffuse violaceous flush. If any vessels can be seen individually, they are straight, deep under the conjunctiva, and do not move when the overlying conjunctiva is

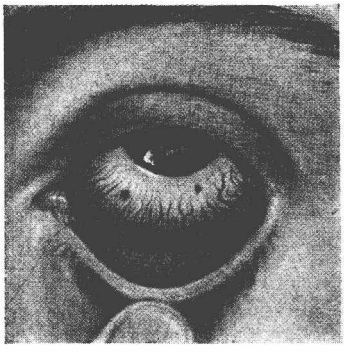

Fig. 2. Injection of the conjunctival blood vessels—superficial congestion.

Fig. 3. The normal fundus with physiologic cupping (see p. 15).

moved gently with an applicator. This form of congestion is called a ciliary flush.

When one or the other form of congestion is present alone, there is seldom any doubt as to its character. Both types of congestion may be present, however. This is nearly always true in severe inflammatory conditions of the eye, so that it is not always easy to make a diagnosis of the underlying disease by this sign alone.

The size and color of the *pinguecula* should be noted. This is