
OPTHALMIC

PLASTIC SURGERY

Second Revised Edition

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TO
MY WIFE

Preface to the Second Edition

The reception accorded this work which has made a second edition possible so soon is gratifying for two reasons: First, the approbation of one's peers and betters is always pleasant. Secondly, and of greater importance, it has given me the opportunity to expand and organize a large portion of the original material.

Some of the changes are the result of the give-and-take of instruction and discussion. Questions asked by keen students seeking clarification and explanation have pointed up needed revision and amplification of the text. Again, many of the changes both in text and illustrations reflect five years of additional experience in clinic and operating room. Time and experience are invaluable teachers but also mighty chasteners of the ego. Under their relentless sway ideas and beliefs may become hard fact, but the seemingly unchangeable may also wilt to something less than a categorical absolute. In other words, we live and learn—and change.

The principles enunciated in the first edition have been adhered to here: I have included and discussed fully only those technics and procedures with which I am familiar. The exceptions to this rule are noted as such. And, as in the previous work, I have attempted to emphasize illustration rather than explanation. Hence old drawings have been revised where necessary and new ones have been added.

Finally, I am thankful for the many suggestions of critical friends and friendly critics (they are not always the same) which have helped shape this revision. Uncritical praise is fine but honest criticism is probably more salutary. I cannot deny that I appreciate both.

New York
September 1957

SIDNEY A. FOX

Preface to the First Edition

It is a pity that prefaces are not read more often.

For this is the only place where an author can state his credo, can outline the schema of his work and give the reasons for the omissions and commissions which his colleagues will inevitably find. This is the only place where he can at least attempt to forestall the critical shafts which will be loosed at his bemused head.

For instance, I am quite aware that for every procedure found here, there are several alternate technics, probably equally good, which have been left out. But the embarrassment of riches which confronts the author of a book like this forces him to an early choice: Is this to be an encyclopedia or a book based on his own experience? With the few exceptions mentioned in the text, I have chosen to include here only those technics which I have used and which have proved satisfactory in my hands.

I have tried to write this book for the practising ophthalmologist, not the surgical specialist. I have attempted to include here in systematic and progressive order all the basic classical operations of our specialty. Except for a few final chapters on the more esoteric reconstructive aspects of lid surgery, all the procedures found here are those commonly used in everyday practice. In each case I have attempted to explain why a particular procedure was used, why modifications in technic were made and what alternative procedures are available. At the end of each chapter a list of references has been appended. While understandably incomplete, this includes not only the source material but also additional references for those interested in a particular subject.

In a book of this sort illustrations are of paramount importance. The ideal set of diagrams is that one which tells its story with little or no recourse to text. Admittedly this is an ideal which is rarely attained but I have aimed for it. In the preparation of the drawings the sole criteria were clarity and simplicity. While crudity was avoided, art for art's sake was not encouraged. Nor was any attempt made to "prettify" the final results of surgery. I wish it had been possible to include even more drawings.

With all this, it is axiomatic that no book alone, however well written and illustrated, can teach surgery. Surgical judgement, dexterity of technic and the ability to deal with the unexpected can only be acquired by experience. The function of any surgical textbook is to outline clearly and simply the basic technics and to call attention to the common pitfalls. The aim here

has been to do this graphically, i.e., to illustrate rather than to define: hence the emphasis on illustrations.

I wish to thank the publishers of the *American Journal of Ophthalmology* and the *Archives of Ophthalmology*, H. K. Lewis & Co., Ltd., London, and The Blakiston Co., Philadelphia, and Grune and Stratton, Inc. for their permission to use some of my own previously published materials as well as that of other authors. Grateful acknowledgment is also made to all individual authors for references and quotations from their original articles and books. My sincere thanks goes to Mrs. F. C. Noble for her gracious permission to use some drawings of my late chief, Dr. Webb W. Weeks, as models.

To the artists, Messrs. Lou Barlow and Joseph DiTucci, goes my sincere appreciation for their excellent work and my admiration for their patience with, I am afraid, a sometimes impatient taskmaster.

My greatest debt of gratitude is due to Miss Helen Holoviak who has been a tower of strength to me in this undertaking. Without her constant, unflagging assistance this work could not have been completed.

In a larger sense, too, I must acknowledge my indebtedness to all my predecessors and contemporaries in this work. We all profit more from the knowledge of others than we can possibly contribute.

New York
August 1952

SIDNEY A. FOX

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CHAPTER 1

The Brow and the Lids: Anatomy

I. SURFACE ANATOMY

THE EYEBROW and lids are the important protective elements of the eyes. In their exposed position, they are the first bulwarks against the irritations and injuries to which the eye is constantly subjected. The jutting overhang of the brow is a stationary defense. The reflexly acting lids, constantly in motion, constitute a mobile guard against the dust, smoke, glare, heat, cold, foreign bodies and the thousand and one insults of man and nature. It is not remarkable that the brow and the lids suffer many injuries. What is a matter for wonder is that this occurs so often leaving the eye intact.

THE EYEBROW

The eyebrow is an horizontal eminence separating the upper lid from the forehead. It is covered with an arching growth of hair which is thickest medially and tapers off to a thin line laterally. The supply of brow hair is not standard and varies with the individual. In some, the hairs are abundant and thick; in others, they are thin and sparse. In general they partake of the character of the scalp hair and, since they are important cosmetically, this similarity becomes important in plastic surgery when one is forced to restore the eyebrow. Medially, where thickest, the hairs of the brow tend to grow somewhat below the orbital margin. Temporally they form a thin line a little above the external orbital border. In general the hairs of each brow are directed outward toward the temple except those closest to the glabella, which run straight upward. The glabella is usually clean of hair. Occasionally it contains a few short hairs; more rarely, it is so thickly covered that there seems to be no separation at all between the eyebrows.

THE LIDS

Below the protective hirsute prominence of the brow lie the opposed upper and lower lids. When closed they protect the cavelike opening which is the orbit. Together they extend from the brow above to the cheek be-

low and from the frontomaxillary orbital margin medially to the frontozygomatic orbital margin laterally. When closed they offer a waterproof, hermetically sealed shutter which is difficult to pry open against resistance.

Lid Furrows

The skin of the lids shows several furrows which are important surgical landmarks (fig. 1). The most important is the upper palpebral furrow in the upper lid which marks the attached upper border of the tarsus and establishes the limit between smooth and folded parts of the conjunctiva. Most of the levator attachment is below this line. Hence, above the superior palpebral furrow, where the skin has no attachment to the levator, the skin

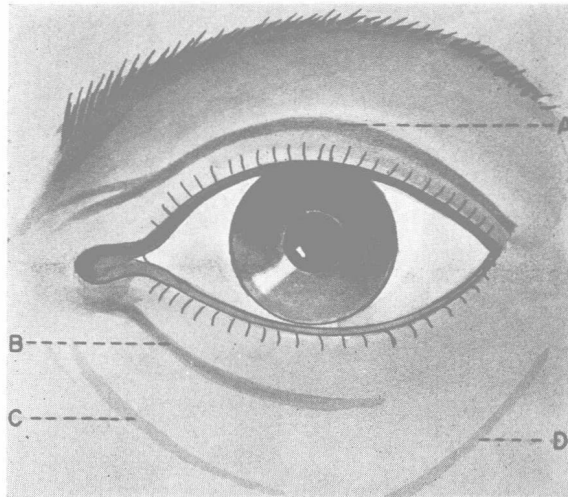


FIG. 1. The palpebral furrows. A. Superior. B. Inferior. C. Nasojugal. D. Malar.

is loose and tends to overhang the furrow as the lid moves up. In the lower lid the homologous inferior palpebral furrow is rarely defined as clearly and, indeed, is often absent except in infancy. Also in the lower lid two other faint furrows can sometimes be made out in older individuals: the malar and nasojugal furrows. The former is seen more often. The latter marks the position of the facial artery and vein extending to the medial canthus. These furrows mark the site of attachment of the skin to the lower temporal and nasal periosteum of the orbital margin respectively. Surgically these landmarks are important because they indicate fascial barriers which limit the passage of hemorrhage and inflammation to and from the orbit.

Palpebral Fissure

When the eyelids are closed normally, as in sleep, the line of juncture between the two lids is not a perfectly straight line but one which rises

slightly at its medial end and drops perceptibly at the lateral end. It lies approximately at the level of the lower limbus. As will be seen, the reverse is true when the eye is open, for then the external canthus is higher than the internal. When open naturally, the lids uncover an irregular ellipse, the palpebral fissure, in which most of the cornea and a little of the sclera is framed. This opening measures approximately 30 mm. horizontally and may measure as much as 14 to 15 mm. vertically at its widest point. It can be stretched voluntarily to a width of 18 mm. In proptosis and high myopia more of the eye is visible. The curve of the upper lid is greatest at the juncture of its inner and middle thirds, that of the lower lid at the juncture of the middle and outer thirds. With the eyes open, the external canthus is higher than the internal canthus in all eyes (fig. 2). In the white races

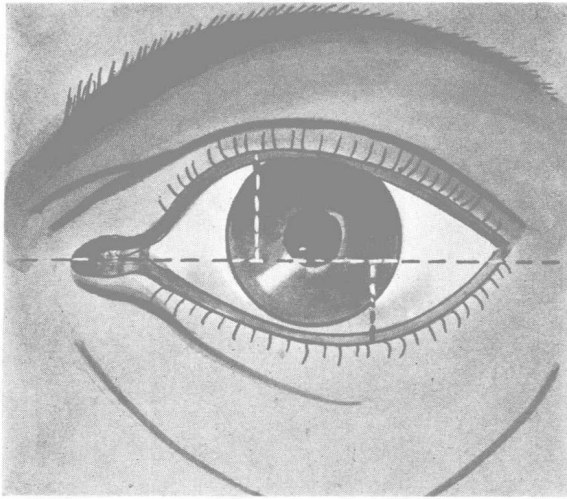


FIG. 2. The normal palpebral fissure.

this difference in height is only about 3 or 4 mm. In the Mongolian races it is much greater and a distinct slant upward and outward is to be noted.

As has been stated, the palpebral fissure is not a perfect ellipse. Externally, the lids meeting at the lateral commissure form a sharp, acute angle, the external canthus, and lie flush against the eyeball. At the medial canthus the fusion of the two lids is more rounded, and the medial commissure is 5 to 7 mm. away from the globe, being separated by the lacus lacrimalis (the lake of tears), which contains the plica semilunaris and, more medially, the caruncle. The plica semilunaris is a fold of conjunctiva which in humans is a vestigial remnant of the nictitating membrane or third eyelid of the lower species. The caruncle is a reddish, irregular, fleshy little eminence measuring about 4 or 5 mm. vertically and 3 mm. across, lying between the plica and internal canthus. It is actually a modified form of

skin and contains some sebaceous glands and a few hairs. The caruncle is not a particularly handsome structure, taken by itself, but it is an important cosmetic adjunct in the overall picture of the eye. Its absence or malposition is readily noticeable. Hence, it is important to know that it is attached not only to the plica semilunaris but also to the sheath of the internal rectus muscle. When displaced by an improper dissection of this muscle the eye acquires a "stary" or "glassy" look.

Most of the opening and shutting of the eye is done by the upper lid. Opening is accomplished by a unique muscle, the levator palpebrae superioris, which pulls the lid up from in front of the cornea when the eye opens. The lower border of the upper lid then overrides the limbus and is normally situated approximately halfway between the pupillary border and the limbus in average illumination (when the pupil is 3 to 4 mm. in size). However, this may vary as much as a millimeter or two.

The border of the lower lid is usually just at the lower limbus but may be a trifle lower. The lower lid takes but little part in the process of opening and shutting the eye. Its only movement is a slight rise when the eye is shut and a slight lowering when the orbicularis and inferior rectus relax and the eye is opened.

Lid Margins

The margin of the lids is about 2 mm. in width and covered with skin. The anterior edge of the margin, from which the cilia project in several rows, is rounded. The cilia are longer, more numerous and coarser in the upper lid than in the lower. They curl upward in the upper lid and downward in the lower. The cilia thus serve to protect the eye from flying particles from both above and below. When lost they usually grow back in 8 to 10 weeks.

The posterior edge of the lid border is sharp and fits closely against the globe. When examined carefully, the openings of the meibomian glands may be noted just in front of the posterior edge of the lid border.

Also to be noted on the lid margin is the intermarginal groove, a faint grayish line just anterior to the openings of the meibomian glands, which marks the natural anatomic division of the lid between the tarsus and orbicularis. This "gray line" is a ready-made cleavage plane supplied by nature for the surgeon, always available and usually identifiable, unless much trauma, pathology and scarring have preceded operative procedure. By incision here the lid is split easily into skin-muscle and tarsoconjunctival laminae, and the surgeon has two clean tissue surfaces with the best possible conditions for normal postoperative healing.

The portions of the lid which bound the plica semilunaris lose the