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CUTANEOUS ABNORMALITIES OF THE EYELID AND FACE

An Atlas with Histopathology

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MCGRAW-HILL BOOK COMPANY

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CUTANEOUS ABNORMALITIES OF THE EYELID AND FACE: AN ATLAS WITH HISTOPATHOLOGY

1 2 3 4 5 6 7 8 9 0 LEH HOR 8 9 4 3 2 1 0 9 8 7

ISBN 0-07-024795-1

This book was set in Aster by York Graphic Services, Inc. The editor was Stuart D. Boynton; the production supervisor was Avé McCracken; the designer was Maria Karkucinski.
Lehigh Press Lithographers was printer and A. Horowitz & Son Bookbinders was binder.

Library of Congress Cataloging-in-Publication Data

Cutaneous abnormalities of the eyelid and face.

Includes bibliographies and index.
1. Eyelids—Diseases—Atlases. I. Griffith, Don G. II. Salasche, Stuart J. III. Clemons, Donald E. [DNLM: 1. Eyelid Diseases—atlases. 2. Eyelids—pathology—atlases. 3. Skin—pathology—atlases. WW 17 C988]
RE121.C88 1986 617.7'71 86-27170
ISBN 0-07-024795-1

This book is dedicated to
two fine clinicians:
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PREFACE

There are many specialists whose work brings the eyelids and face of patients under close scrutiny. Therefore, an opportunity frequently presents itself to these professionals to identify health problems for management or referral that might otherwise be overlooked. Although many common cutaneous lesions show up on the eyelids and face as well as elsewhere on the body, some are different in character and appearance from other locations because of unique characteristics of the skin of the eyelid and face. A few cutaneous lesions—for example, syringomas and hydrocystomas—seem to prefer those locations. Hence the need for this book. While it is not feasible to search out, let alone include, every lesion occurring on the eyelid or face, we have attempted to describe most of those a practitioner is likely to encounter. It is our hope that a ready reference with abundant but carefully selected illustrations will suit the needs of these specialists, from ophthalmologists and plastic surgeons to optometrists. Furthermore, we believe that inclusion of histopathologic descriptions and photomicrographs will facilitate definitive diagnosis and understanding of the pathologic process.

Throughout we have been guided by the goal of accessibility. A brief description of typical characteristics of each entity is given under "Key Features." The conditions discussed are pictured nearby, in most cases on the opposite page, and in full color, using the finest reproduction methods and printed on high-quality paper. Also for reasons of accessibility, we have sought to limit illustrations to the best examples, even when space was thereby left unused.

This atlas would not have been possible were it not for the generosity of colleagues who have loaned prized photos of unusual cases. In addition, special thanks go to Drs. William Lloyd, III, William James, Eric Kraus, and James Keeling, III, for the sections on Gross Anatomy and Histology, Dermatoses and Hypersensitivity, Fungal Diseases, and Pigmentary Problems, respectively.

Don G. Griffith
Stuart J. Salasche
Donald E. Clemons

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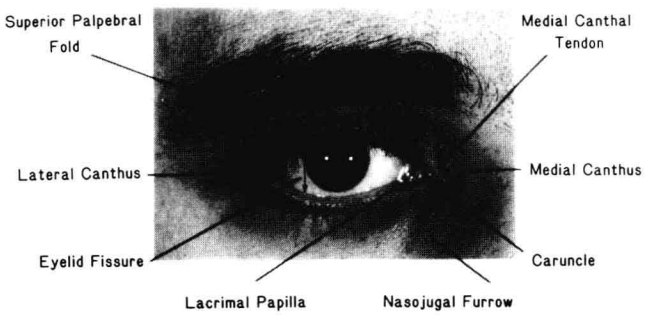
PART ONE

GROSS ANATOMY AND HISTOLOGY

William C. Lloyd, III

The eyelids are remarkable structures. They shield the eye from hazardous light and fumes, excessive moisture and dryness, foreign bodies, microorganisms, and particulate matter. Their secretions and unique tear-pumping apparatus maintain a hygenic ocular environment, and when the eye is injured, the eyelids provide a superior bandage. They can be the earliest sign of a neurologic disorder, and abnormalities of the skin or lashes may point to an underlying systemic disease. Familiarity with the basic anatomy and function of the lids is helpful in understanding the various pathologic conditions that affect them.



External eyelid anatomy. *Principal landmarks are identified.*

EYELID DEVELOPMENT

The eyelids form a major component of the ocular adnexa, that is, those structures that aid in the function, protection, and mechanical support of the globe. Surface ectoderm contributes to the development of eyelid skin, various glands, and tear excretory pathways. In rare instances, the eyelids remain fused at birth (ankyloblepharon), requiring early surgical lysis. Incomplete eyelid formation (coloboma) is seen more frequently in the upper lid. Colobomas can vary from a subtle notching to complete absence of the lid. Other developmental defects may cause the eyelids to be distorted such that the lashes may be misdirected outward (ectropion) or inward (entropion), resulting in the lashes rubbing on the eye (trichiasis). Occasionally, one or more extra rows of lashes will be present (distichiasis) and may also turn in to irritate the eye. Most healthy newborn infants cry without tearing while awaiting commencement of lacrimal secretory function.

EYELID TOPOGRAPHY

The pattern of eyelid skin folds and furrows contributes greatly to individual appearance. They also clue the surgeon to some vital anatomic landmarks. The most prominent is the superior palpebral fold. This furrow is absent in most Orientals. The skin beneath the furrow is firmly adherent to the tarsus and to the muscle fibers that elevate the lid. Such attachments are absent above the furrow, and the skin there is lax. In the lower lid, the nasojugal and malar furrows denote skin attachments to the orbital periosteum. Inadvertent altering of the furrows can create an unwanted asymmetry of the face.

In Caucasians the palpebral fissure averages 25 mm in width and 9 mm in height at the midpoint. Normally during sleep the fissure is fully closed, and the eye is rotated superiorly (Bell's phenomenon). Failure of the eyelid to completely close (lagophthalmos) may result in drying and irritation. Lagophthalmos coupled with an absent Bell's phenomenon can lead to corneal damage with loss of vision.

In straight-ahead gaze, the upper eyelid covers approximately 1 mm of the superior cornea, whereas the lower lid margin rests at the limbal junction between the clear cornea and white sclera. Deviant eyelid position may accompany proptosis, enophthalmos, trauma, or acquired eyelid droop. During upward or lateral gaze, the palpebral fissure normally widens. The opposite action, narrowing, occurs when looking down or medially.

Rapid reflex blinking is a response to offensive stimuli, whereas spontaneous blinking refreshes the tear film. The rate of spontaneous blinking varies with activity—approximately every 2 seconds while talking, slowing to every 30 seconds while reading. The average rate is 15 blinks per minute. Functional spasmodic closure of the lids (blepharospasm) can be a severely disabling condition. Systemic medications, radical denervation surgery, and paralytic injections using botulinum toxin have all met with variable degrees of success in its treatment.

SURFACE ANATOMY

The upper and lower eyelid margins merge at both ends to form the medial and lateral canthi. Each canthus is anchored to the bony orbit by means of the fibrous canthal tendon of the orbicularis muscles. The medial canthal tendon overlies the lacrimal sac. Normal blinking acts on the sac to generate a transient negative pressure, which facilitates tear drainage from the surface of the eye. With aging, laxity of the skin of the lids may result in dermatochalasis (sometimes called blepharochalasis). This "baggy lid" appearance may be compounded by orbital fat bulging under the thinned orbital septum.

The lid margin is the 2-mm-wide junction between the keratinized and mucosal surfaces of the eyelid. The lashes mark the external boundary of the lid margins. Roughly 100 to 150 cilia occupy the upper margin, arranged in two or three uneven rows. Only about half as many adorn the lower lid. Careful inspection of the lid margin reveals a faint gray line immediately posterior to the lashes. Continuing posteriorly toward the conjunctiva, one next encounters the orifices of the meibomian glands—about 40 in the upper lid and 20 to 30 in the lower. These sebaceous glands originate deep within the tarsus. The mucocutaneous junction lies at the most posterior edge of the lid margin. Smooth contact between the eyelid margin and the globe is necessary for even distribution of the tear film across the cornea. In contemplating any procedure that might involve the eyelid margin, one must take appropriate steps to correct for any residual tissue defect. Failure to restore the original eyelid margin contour may result in inadequate corneal wetting, exposure keratopathy, and excessive tearing (epiphora).

The puncta, surrounded by the slightly protuberant lacrimal papillae, are located near the medial end of each lid margin. The canaliculi carry tears from the punctum to the lacrimal sac and are only a few millimeters from the skin surface. Special care must be employed to preserve their patency when managing lesions involving the medial eyelid. Acute inflammations, trauma, and tumors involving the medial lid may also disrupt this delicate anatomy and compromise tear outflow.

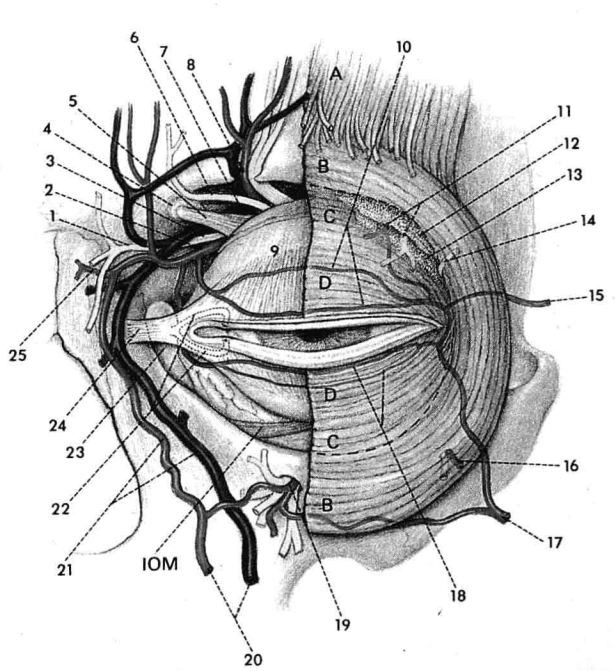
Marked dermatochalasis due to loss of elastic tone in the skin of the eyelid.

GROSS AND MICROSCOPIC ANATOMY

The complex arrangement of eyelid structures is best understood by examining the separate layers from skin to conjunctiva. Except where noted, complementary features of the upper eyelid are also present in the lower lid.

Eyelid skin is generally represented to be the thinnest in the body, and it thins further with advancing age. Eyelid skin contains a keratinized epidermis atop a poorly defined papillary dermis without rete ridges. A fine areolar subcutaneous layer adjoins the skin to the underlying orbicularis muscle. This creates a potential space, which is an ideal site for infiltration of local anesthetic. Likewise, it is a ready reservoir for hemorrhage, pus, or edema fluid. Although the eyelids are generally considered to extend only to the region of the orbital rim, the thin skin characteristic of the lids usually extends a short distance beyond the orbital rim, an observation which must be considered when doing skin grafts in the periorbital region. The next layer, the orbicularis muscle, is innervated by the facial nerve and functions to close the eyelids. The eyelid is one of the few locations where skeletal muscle lies so close to the skin surface. The orbital portion of the orbicularis encircles the orbital rim, and the palpebral portion overlies the eyelid proper.

Most larger nerves and blood vessels that serve the eyelid are situated behind the orbicularis. The eyelids have a rich vascular supply with contributions from both the ophthalmic branch of the internal carotid artery and the facial artery, which is a branch of the external carotid. Understanding this dual supply is of particular importance in the management of arteriovenous malformations of the lids and orbit. Venous drainage has analogous duplicate outflow destined for the jugular veins. A large vascular arcade courses through the peripheral region of the lid, with a smaller arcade running near the lid margin. This remarkable vascularity facilitates healing of traumatized eyelids and affords a formidable defense against infection. As a result, eyelid skin grafts enjoy a high success rate in relation to other regions.



Anatomy of ocular adnexal structures. A, frontalis muscle; B, orbital orbicularis muscle; C, preseptal orbicularis muscle; D, pretarsal orbicularis muscle; IOM, inferior oblique muscle; 1, infratrochlear nerve; 2, ophthalmic (orbital) artery; 3, nasociliary nerve; 4, trochlea; 5, reflected tendon of superior oblique muscle; 6, supratrochlear nerve; 7, superior orbital vein; 8, supraorbital artery, vein, and nerve; 9, levator aponeurosis; 10, peripheral and marginal arterial arcades of the upper lid; 11, lacrimal artery and nerve (terminal branches); 12, orbital lobe of the lacrimal gland; 13, palpebral lobe of the lacrimal gland; 14, zygomaticotemporal nerve; 15, anterior branch of temporal artery; 16, zygomaticofacial artery and nerve; 17, malar branch of transverse facial artery; 18, peripheral and marginal arterial arcades of lower lid; 19, infraorbital artery and nerve; 20, facial artery and vein; 21, angular artery and vein; 22, canaliculi; 23, lacrimal sac; 24, medial canthal tendon; 25, dorsal nasal artery. (From Beard C, Sullivan JH: Anatomy of the eyelids, lacrimal system, and orbit, in Stewart WB, ed., *Ophthalmic Plastic and Reconstructive Surgery.* San Francisco, American Academy of Ophthalmology, 1984. Joan Weddell, illustrator. Used with permission.)

The orbital septum, a tissue plane of great clinical importance, lies deep to the orbicularis muscle. It extends from the orbital rim to the eyelid to provide an almost unbroken barrier across the anterior orbit. (A small anatomic discontinuity is present around the lacrimal sac.) This barrier restricts fluid passage in both directions—into or out of the orbit. Superficial eyelid infections rarely penetrate beyond the septum, but by the same token, an acute orbital infection compressing the orbital contents cannot drain without surgery.

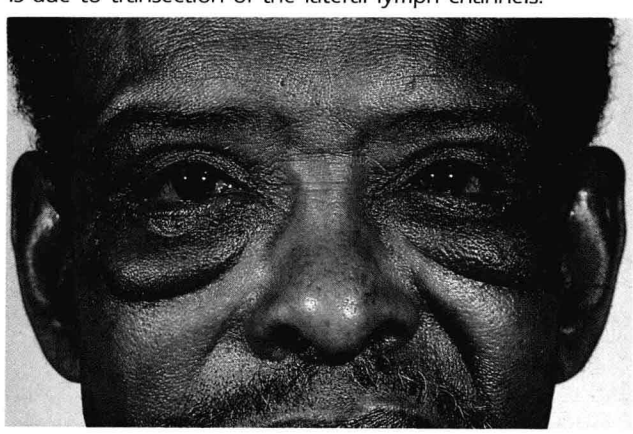
The tendon or aponeurosis of the levator palpebrae superioris muscle of the upper lid originates at the apex of the orbit and passes between the globe and the roof of the orbit to insert into the anterior surface of the upper tarsal plate. The levator passes through the orbital septum and in Caucasians sends slips into the skin of the eyelid to form the superior lid fold. Damage to the muscle or its innervation (supplied by branches of the third cranial nerve) may result in either a drooping (ptotic) or retracted upper lid. Close association with the superior rectus muscle of the eye accounts for the frequent finding of poor elevation of the globe in patients with ptosis.

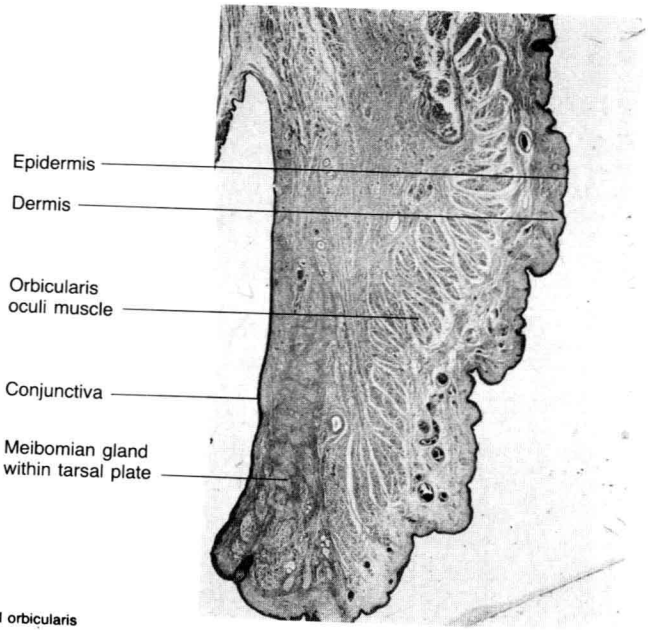
The tarsal plates, composed of dense fibrous connective tissue, give the eyelid margins their semirigid contour and house the parallel rows of meibomian glands. The tarsi support the lateral four fifths of the lids, extending from the lateral canthus to the punctum. The 10-mm height of the superior tarsus is nearly twice that of the lower lid plate.

Sympathetically innervated muscle fibers originating from the posterior leaf of the levator palpebrae muscle attach to the superior tarsal edge. This is Mueller's muscle, and it contributes 2 to 3 mm of tonic eyelid elevation. Damage to the ocular sympathetic pathway results in a moderate ptosis associated with a smaller pupil on the same side (Horner's syndrome).

The inner mucosal surface of the eyelids is the nonkeratinized palpebral conjunctiva. This transparent epithelial membrane overlies a highly vascularized substantia propria. The palpebral conjunctiva conforms to the contours of the cul-de-sac and is continuous with the bulbar conjunctiva. The tear volume in the

Extensive lymphedema following lid surgery. Lymphedema is due to transection of the lateral lymph channels.





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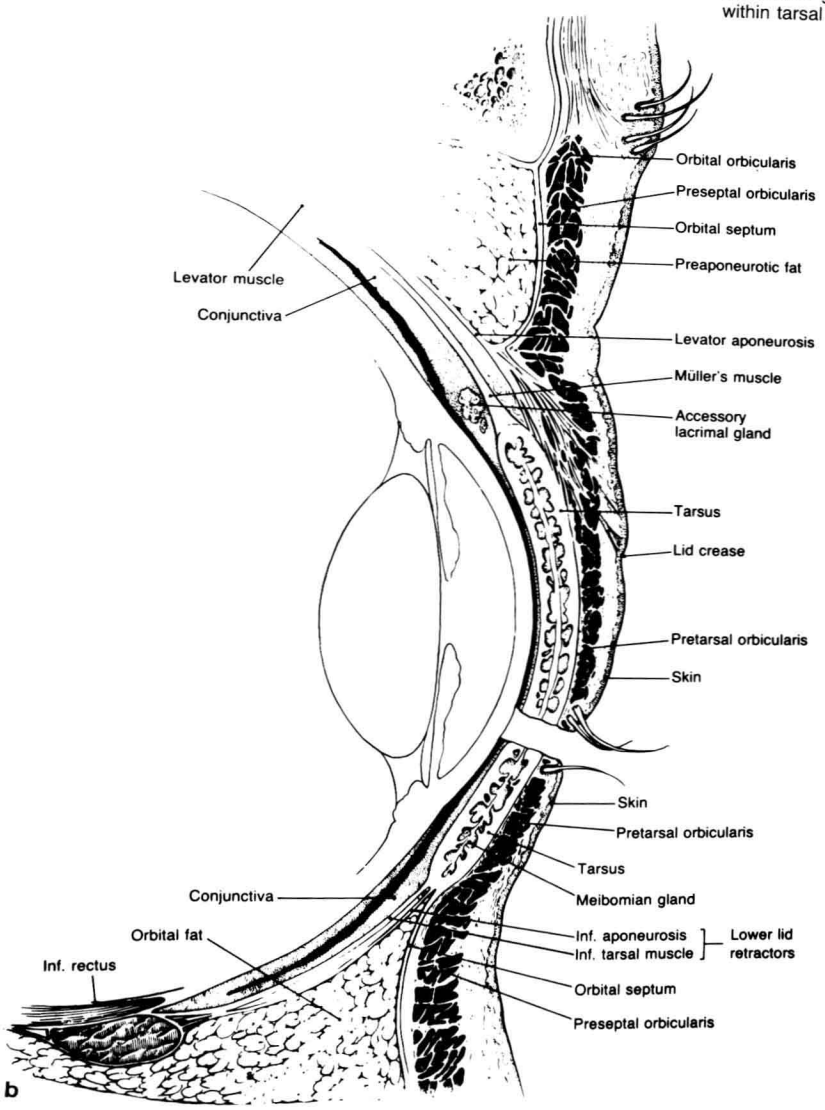

b

Eyelid anatomy in cross section. A. Low-power histologic section of upper eyelid. Hematoxylin and eosin stain. (Courtesy of Dr. M. C. Kincaid.) **B.** Artist's representation of eyelid structure. (From Leone CR: Plastic surgery, in Spaeth GL, ed., *Ophthalmic Surgery.* Philadelphia, Saunders, 1982. Mark Weakley, illustrator. Used with permission.)