

Contents

Preface	xi
Contributors	xii
Part I Anatomy and Principles	
1 Anatomy of the Eyelids, Orbit, and Lacrimal System	2
<i>Lora R. Dagi Glass</i>	
2 Fundamental Principles and Techniques of Ophthalmic Plastic Surgery	14
<i>Victoria Starks and Suzanne K. Freitag</i>	
Part II Eyelid Trauma	
3 Traumatic Eyelid Laceration	24
<i>Pete Setabutr and Chau Pham</i>	
4 Eyelid Margin Laceration Repair	29
<i>Neil Shah and Peter W. Macintosh</i>	
5 Canalicular Laceration and Medial Canthal Tendon Avulsion Repair	34
<i>Kyle J. Godfrey, Kristen E. Dunbar, and Gary J. Lelli, Jr.</i>	
Part III Lower Eyelid	
6 Entropion Repair	44
<i>Brittany A. Simmons and Mithra O. Gonzalez</i>	
7 Ectropion Repair	50
<i>Christina H. Choe</i>	
8 Epiblepharon Repair	55
<i>Livia Teo</i>	
9 Repair of Lower Eyelid Retraction	59
<i>Nora K. Siegal and Christopher B. Chambers</i>	
10 Transconjunctival Lower Eyelid Blepharoplasty	67
<i>Mica Y. Bergman and Sandy Zhang-Nunes</i>	
11 Transcutaneous Lower Blepharoplasty	77
<i>Bradford W. Lee</i>	
Part IV Upper Eyelid	
12 External Ptosis Repair	84
<i>Omar Dajani and Alison Callahan</i>	

Contents

13 Internal Ptosis Repair	88
<i>Nora Siegal and Christopher B. Chambers</i>	
14 Frontalis Suspension Ptosis Repair	96
<i>Julius T. Oatts and Alexandra T. Elliott</i>	
15 Repair of Upper Eyelid Retraction (Internal and External)	102
<i>Natalie Homer and N. Grace Lee</i>	
16 Upper Eyelid Gold/Platinum Weight Placement	107
<i>Liza M. Cohen and Suzanne K. Freitag</i>	
17 Upper Blepharoplasty	112
<i>Michael E. Migliori</i>	
18 Asian Blepharoplasty	119
<i>Shu-Hong (Holly) Chang and Do Eon Rok</i>	
19 Floppy Eyelid Syndrome (FES) Repair	125
<i>Blair K. Armstrong and Tieu Vy Nguyen</i>	
 Part V Eye Brow	
20 Direct Brow Lift	132
<i>Natalie Wolkow and Suzanne K. Freitag</i>	
21 Endoscopic Brow Lift	138
<i>Anne Barmettler, Michael Tseng, and Javier Servat</i>	
22 Pretrichal Brow Lift	142
<i>Senmiao Zhan and Kian Eftekhari</i>	
 Part VI Eyelid Reconstruction	
23 Tenzel Semicircular Flap	150
<i>Lucas Bonafede and Joseph Giacometti</i>	
24 Hughes Tarsoconjunctival Flap	154
<i>Sonul Mehta</i>	
25 Cutler-Beard Flap	157
<i>Arpine Barsegian and Roman Shinder</i>	
 Part VII Lacrimal	
26 Probing, Irrigation, and Intubation in Congenital Nasolacrimal Duct Obstruction	164
<i>Jason S. Mantagos</i>	
27 Punctoplasty	169
<i>Larissa H. Habib</i>	

28 External Dacryocystorhinostomy (DCR)	173
<i>Suzanne K. Freitag and Michael K. Yoon</i>	
29 Endoscopic Dacryocystorhinostomy	179
<i>Daniel R. Lefebvre</i>	
30 Conjunctivodacryocystorhinostomy	185
<i>Adam Weber and Michael T. Yen</i>	
Part VIII Orbit Surgery	
31 Orbital Floor Blowout Fracture Repair	192
<i>Nicholas Mahoney</i>	
32 Medial Orbital Blowout Fracture Repair	196
<i>Seanna Grob, Emily Charlson, and Jeremiah P. Tao</i>	
33 Lateral Wall Orbital Decompression	201
<i>Honglei Liu and Hunter Yuen</i>	
34 Orbital Decompression: Floor and Medial Wall Via an External Approach	208
<i>José Luis Tovilla-Canales and Osiris Olvera-Morales</i>	
35 Fat Removal Orbital Decompression	215
<i>Hunter Yuen and Shu Lang Liao</i>	
36 Endoscopic Orbital Decompression	219
<i>Benjamin S. Bleier and Sarina K. Mueller</i>	
37 Anterior Orbitotomy	225
<i>Catherine Y. Liu and Vinay K. Aakalu</i>	
38 Lateral Orbitotomy	234
<i>Edward J. Wladis</i>	
39 Transcranial Orbital Approaches	239
<i>Wenya Linda Bi and Ian F. Dunn</i>	
Part IX Anophthalmic Socket	
40 Enucleation	246
<i>Prashant Yadav</i>	
41 Evisceration	254
<i>Sanjai Jalaj and Bryan J. Winn</i>	
42 Exenteration	261
<i>Ann Q. Tran and Catherine J. Choi</i>	
43 Dermis Fat Graft	268
<i>Victoria Starks and Suzanne K. Freitag</i>	

Contents

Part X Miscellaneous

44 Temporal Artery Biopsy	274
<i>Juan C. Jimenez-Perez</i>	
45 Aberrant Eyelash Management	279
<i>Ashley A. Campbell and Roxana Fu</i>	
46 Tarsorrhaphy (Temporary and Permanent)	285
<i>Seanna Grob, Emily Charlson, and Jeremiah P. Tao</i>	
Index	291

Preface

We were inspired when Thieme approached our ophthalmic plastic surgery team to compile and edit a practical textbook on the most common procedures performed in the periorbital area, including eyelid, orbit and lacrimal surgery. We were particularly enthusiastic to tackle this project because we feel that there is a dearth of currently available ophthalmic plastic surgery textbooks that serve as practical how-to guides for procedures.

This book was designed with a dual purpose in mind. First, by nature of its structured format, it is a concise surgical atlas targeted for residents and fellows – the type of book that can be reviewed efficiently the night before surgery by trainees in order to have an understanding of the basic principles and steps of the surgery. The second purpose and strength is that each chapter is written by an author who is an expert in the field, providing advanced tips and pearls based upon years of experience performing the procedure. Hence, the book is pertinent for more experienced surgeons with the goal of improving technique and outcomes as well. The text is most directly targeted for ophthalmic plastic surgeons, but the material is useful for any surgeon performing procedures in the periorbital area, including ophthalmologists, otolaryngologists, facial plastic surgeons, plastic surgeons, dermatologists and maxillofacial surgeons.

We have recruited authors who are experts in the field from across the United States and around the world. The book is divided into 10 parts with a total of 46 chapters. The first chapter is a detailed overview of the anatomy of the

eyelids, orbit and lacrimal system. The second chapter discusses fundamental principles of periorbital surgery. The following 44 chapters discuss a wide range of topics, including: eyelid trauma, lower eyelid, upper eyelid, eyebrow, lacrimal system, aberrant last management, tarsorrhaphy, orbit surgery, anophthalmic socket, and temporal artery biopsy.

Like Thieme's other Tricks of the Trade series of textbooks covering a wide range of surgical subspecialties, each chapter is subdivided into the same logical sections that include: goals, advantages, expectations, key principles, indications, contraindications, preoperative preparation, operative technique, tips/pearls/expert suggestions, what to avoid, complications/bailout, postoperative care, and references. The chapters contain numerous figures, illustrations and photographs to demonstrate the salient points. The procedures are presented in a step-by-step fashion for ease of understanding.

We hope that surgeons of all levels of experience will enjoy reading and utilizing this textbook as much as the editors enjoyed designing and compiling it. We hope that this book will serve as a standard for disseminating concise useful information about the core procedures in the ophthalmic plastic surgery armamentarium.

Suzanne K. Freitag, MD

N. Grace Lee, MD

Daniel R. Lefebvre, MD, FACS

Michael K. Yoon, MD

Videos

A selection of videos is available on MedOne illustrating the concepts and procedures covered in this book.

Part I

Anatomy and Principles

- | | | |
|---|---|----|
| 1 | Anatomy of the Eyelids, Orbit, and Lacrimal System | 2 |
| 2 | Fundamental Principles and Techniques of Ophthalmic Plastic Surgery | 14 |



Anatomy and Principles

1 Anatomy of the Eyelids, Orbit, and Lacrimal System

Lora R. Dagi Glass

Summary

This chapter reviews anatomy of the eyelids, lacrimal system, and orbit. Anatomic knowledge is the basis of ophthalmic plastic and reconstructive surgery. By thoroughly understanding the relationship between the various layers and structures, a surgeon can often preserve functionality and cosmesis of the orbit and periocular region.

Keywords: anatomy, eyelid, lacrimal system, orbit

1.1 Eyelids

The eyelid structures are herein described in an anterior-to-posterior approach (► Fig. 1.1).

1.1.1 Skin

Eyelid skin is extremely thin, and notably lacking in subcutaneous fat. The upper eyelid skin crease, found 8 to 10 mm above the lid margin in non-Asian eyelids, is composed of fine attachments of the levator aponeurosis through overlying orbicularis muscle to the skin.¹ Asian eyelids may not have an upper eyelid crease, or may have a significantly lower crease.

The medial and lateral canthal angles are the angles created by the joining of the medial and lateral upper and lower eyelids, respectively.

1.1.2 Orbicularis Muscle

The orbicularis oculi muscle is a protractor, or muscle of eyelid closure, and is divided into three portions: orbital, overlying the orbital bone; preseptal, overlying the septum; and pretarsal, overlying the tarsus. As it approaches the eyelid margin, orbicularis muscle is termed "the muscle of Riolan," visualized as the gray line. It is innervated by cranial nerve 7, the facial nerve (► Fig. 1.2).

Tissue in this plane onwards is considered part of the anterior lamella of the eyelid. Tissue posterior to this plane is considered posterior lamella of the eyelid.

1.1.3 Septum

Orbital septum is a connective tissue layer arising from the bony orbital margin (arcus marginalis) and inserting onto the levator aponeurosis superiorly, and onto the inferior edge of the tarsus inferiorly (► Fig. 1.3). It can be relatively thick in children, but is typically thin in adulthood. It is a crucial zone of differentiation between pre- and postseptal anatomy and processes.

1.1.4 Fat Pads

There are two fat pads superiorly, and three pads inferiorly; all are postseptal, or orbital, and are considered contiguous with extraconal fat. Given their location relative to the levator

aponeurosis, the central upper fat pads are typically referred to as "preaponeurotic fat." The upper and lower eyelids have medial and central fat pads. The lower eyelid has a lateral fat pad.

1.1.5 Lacrimal Gland

The orbital portion of the lacrimal gland can be found lateral to the central preaponeurotic fat pad (► Fig. 1.3). It will be further described in the Orbit section. It is assisted in tear production by the fornix-based accessory lacrimal glands of Krause and Wolfring.²

1.1.6 Eyelid Retractors

The levator palpebrae superioris is the major muscle of upper eyelid retraction (► Fig. 1.3). It arises from the lesser sphenoid wing and projects anteriorly until Whitnall ligament just posterior to the orbital rim, at which point the vector is changed to a vertical system of retraction.¹ At approximately the same point of change, the muscle transitions to its aponeurosis, which ultimately inserts onto the anterior face of the tarsus. As previously described, various muscle fibers also travel anteriorly, ultimately forming the upper eyelid skin crease. This muscle is striated and innervated by cranial nerve 3, the oculomotor nerve.

Müller muscle arises from the condensation of the levator palpebrae superioris and Whitnall ligament, and inserts upon the upper tarsal border.¹ Unlike the levator muscle, Müller muscle is a smooth, sympathetically innervated muscle.

The capsulopalpebral fascia is the major retractor of the lower eyelid. It is a fibrous sheet extending from Lockwood ligament, traveling parallel to the inferior rectus and around the inferior oblique prior to inserting along the inferior tarsal border.¹

1.1.7 Tarsus

Tarsus is a dense tissue plate found just underneath the lid margins (► Fig. 1.3). It is up to 10 mm in maximal vertical height in the upper lid, and up to 4 mm of maximal vertical height in the lower lid.¹

The medial and lateral canthal tendons arise from the medial and lateral tarsal plates, and are further strengthened by orbicularis oculi muscle heads.

1.1.8 Margin

The eyelid margin is an epithelialized platform noted along the upper and lower eyelids. Eyelash follicles lie deep to the eyelid margin anterior to the tarsus, and eyelashes exit the margin anteriorly. The gray line demonstrates the location of orbicularis oculi muscle. Meibomian gland orifices are microscopically visualized in line with the deeper tarsus, which envelops them.

The interpalpebral fissure, or space between the eyelid margins, spans approximately 1 cm vertically, and 3 cm horizontally. The upper eyelid usually falls approximately 1 mm below