Mark R. Levine
Richard C. Allen
Editors

Manual of Oculoplastic Surgery

Fifth Edition

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Springer

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To my wife Missy, son Augustus, and daughter Astrid.

Richard C. Allen

To my wonderful family who have always been loving and supportive: Wife Ellen, Marne, Lindsey, Phil, Jackson, and Zander.
In memory of my extraordinary wife Teri and my parents Dorothy and Donald Levine who always shared their wisdom, love, and encouragement of academic pursuit.

Mark R. Levine

Previous illustrations are courtesy of Mark Levine

Preface

The Manual of Oculoplastic Surgery has been available for more than 20 years, giving a cross section of the best available basic surgical procedures in a stepwise fashion to physicians who are interested in the art and science of the oculoplastic surgical discipline. The foundation of the book is the classic techniques and how they are applied in a stepwise fashion. Over the years new and effective techniques have been added and newer and younger authors added.

The fifth edition offers two very important additions: firstly, videos for most of the chapters by a very talented co-editor and surgeon Richard C. Allen. His videos enhanced the illustrations significantly. Secondly, I felt a section on therapeutic considerations for problematic topics such as Graves' disease, lymphoma, dry eyes, antibiotics, and trachoma would be most helpful.

Finally I would like to thank all the authors for their excellent chapter contributions and cooperation in achieving the fifth edition. As always, a special thanks to the members of our exceptional American Society of Ophthalmic Plastic and Reconstructive Surgery for their pursuit of basic research, innovative ideas, and dissemination of information to other societies, academic institutions, and patient information groups. It is an amazing society. I truly have enjoyed the academic interchange and wonderful friendships. I am extremely grateful to my preceptors Richard Tenzel and Byron Smith who gave me my start in our wonderful and challenging field.

Cleveland, OH, USA — Mark R. Levine
Houston, TX, USA — Richard C. Allen

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I have been very fortunate to have outstanding illustrators, most notably Amanda Mendelsohn from the Cleveland Clinic Foundation, improve the quality of illustrations to enhance the text of the contributing authors. The following artists also contributed to the images: from CCF Beth Halasz, MFA, CMI; and 5 student interns from the Cleveland Institute of Art, Biomedical Art program: Siena Fried, Katelyn Ostromek, Robert Pigza, Megan Sigetic, and Emilee Wheeler.

Thank you all so much.

Mark R. Levine

I would like to acknowledge Randall Verdick, videographer, and Trish Duffel, librarian, both at the University of Iowa, for their help in the production of the surgical videos used in this book.

Richard C. Allen

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Part I

Introduction

Applied Surgical Anatomy of the Ocular Adnexa

1

Cat Nguyen Burkat and Courtney Kauh

In performing any oculofacial procedure, the surgeon should be intimately knowledgeable of the anatomical structures, from the more superficial layers progressing to the deeper tissue planes. The variations in anatomy, as well as ethnic and age differences, may influence the surgical approach and technique. Of utmost importance in any procedure is to maintain eyelid stability and lacrimal pump function while optimizing the cosmetic outcome. Local infiltrative anesthesia, regional nerve blocks, and injection of dermal fillers require knowledge of the complex facial vascular network. Likewise, for procedures addressing lacrimal outflow disorders, knowledge of endonasal and sinus anatomy are necessary. The orbital fat pads, neurovascular structures, and extraocular muscles will be discussed to understand the risks among various orbitotomy approaches. Finally, the nuances of the orbital bony structure are important in performing fracture repairs; medial, lateral, or floor orbital decompression; or when operating within the deeper orbital tissues.

This chapter will present the following areas, in conjunction with pertinent clinicoanatomic correlations, to minimize iatrogenic injury:

1. Cutaneous landmarks of the upper face
2. Sensory innervation of the upper face
3. Superficial musculature of the face
4. Motor innervation of the upper face
5. Arterial supply of the eyelids
6. Venous supply of the eyelids
7. Lacrimal excretory system
8. Sinus and endonasal landmarks
9. Anatomy of the eyelids
10. Orbital structures

Cutaneous Landmarks of the Upper Face

The inferior border of the lower eyelid is demarcated by the nasojugal fold (NJF) medially and the malar fold (MF) laterally (Fig. 1.1). The glabellar fold (GF) arises vertically or obliquely at the medial eyebrow, reflective of the corrugator superciliaris muscle contraction drawing the head of the eyebrow medially and inferiorly. The horizontal GFs (HGFs) occur due to vertical depression of the medial eyebrow by the procerus muscles. The multiple horizontal creases in the forehead, above the eyebrows, are secondary to contraction of the wide vertically expanding frontalis muscles (FMs) on each side of the forehead. In general, the cutaneous creases are perpendicular to the direction of the contributing muscle body. The upper lid crease (ULC) and lower lid crease (LLC) are caused by the respective eyelid retractors.

Skin incision lines used most frequently are: (1) transcoronal, (2) pretrichial, (3) midforehead, (4) supraciliary (lateral crescent or small incision), (5) infrabrow with optional S-shaped extension into the lateral commissure and cantholysis, (6) upper or lower eyelid crease, (7) infraciliary approximately 2 mm below the lash line, (8) nasojugal fold, and (9) lateral nasal wall or medial canthal line, such as for exposure of the medial canthal tendon or lateral nasal wall for telecanthal repair.

In the eyelid, the skin and the subcutaneous fibroadipose tissue are very thin. Comparatively, the malar and glabellar areas are covered with denser subcutaneous fibroadipose tissue and thicker skin. The transition between these areas is abrupt. Subcutaneous fat is absent in the pretarsal area, except in eyelids of Asian descent, and sparse in the preseptal region. The pretarsal skin is tightly adherent to the orbicularis muscle. Beyond the lid crease, the preseptal skin is loosely bound to the orbicularis muscle plane.

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