

Oculofacial Plastic Surgery 2017

Clinical Challenges and Surgical Technique—Strategies for Success in Oculofacial Plastic Surgery

Program Directors

Vikram D Durairaj MD and Wendy W Lee MD

In conjunction with the American Society of Ophthalmic Plastic and Reconstructive Surgery

Ernest N Morial Convention Center
New Orleans, Louisiana
Saturday, Nov. 11, 2017



Presented by:
The American Academy of Ophthalmology



2017 Oculofacial Plastic Surgery

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2017 Oculofacial Plastic Surgery Subspecialty Day Planning Group

On behalf of the American Academy of Ophthalmology and the American Society of Ophthalmic Plastic and Reconstructive Surgery (ASOPRS), it is our pleasure to welcome you to New Orleans and Oculofacial Plastic Surgery 2017: Clinical Challenges and Surgical Technique—Strategies for Success in Oculofacial Plastic Surgery.



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Program Director

Stryker Corp/Medical Division: C



Wendy W Lee MD
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Allergan: C
Galderma: C
Merz: C
Ophthalmology Web: C



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Robert G Fante MD FACS
OMIC: Ophthalmic Mutual
Insurance Company: C,L
Strathspey Crown: O



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Mark L Mazow MD
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Oculofacial Plastic Surgery 2017 Contents

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CME Credit

Academy's CME Mission Statement

The purpose of the American Academy of Ophthalmology's Continuing Medical Education (CME) program is to present ophthalmologists with the highest quality lifelong learning opportunities that promote improvement and change in physician practices, performance, and competence, thus enabling such physicians to maintain or improve the competence and professional performance needed to provide the best possible eye care for their patients.

2017 Oculofacial Plastic Surgery Subspecialty Day Meeting Learning Objectives

Upon completion of this activity, participants should be able to:

- Identify modern, evidence-based algorithms in oculofacial plastic surgery disease treatment and determine how to effectively apply them
- Introduce into practice the contemporary management of congenital eyelid and orbital disease, thyroid eye disease, and orbital trauma
- Evaluate complex orbital and oculoplastics cases to understand treatment outcomes
- Gain familiarity with the practice patterns of experienced oculofacial practitioners and understand differences in preferred practice patterns

2017 Oculofacial Plastic Surgery Subspecialty Day Meeting Target Audience

The intended audience for this program is practicing oculofacial surgeons and comprehensive ophthalmologists from around the world with an interest in oculofacial surgery.

2017 Oculofacial Plastic Surgery Subspecialty Day Meeting CME Credit

The American Academy of Ophthalmology is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

The Academy designates this live activity for a maximum of 7 *AMA PRA Category 1 Credits*[™]. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Teaching at a Live Activity

Teaching instruction courses or delivering a scientific paper or poster is not an *AMA PRA Category 1 Credit*[™] activity and should not be included when calculating your total *AMA PRA Category 1 Credits*[™]. Presenters may claim *AMA PRA Category 1 Credits*[™] through the American Medical Association. To obtain an application form please contact the AMA at www.ama-assn.org.

Scientific Integrity and Disclosure of Financial Interest

The American Academy of Ophthalmology is committed to ensuring that all CME information is based on the application of research findings and the implementation of evidence-based medicine. It seeks to promote balance, objectivity, and absence of commercial bias in its content. All persons in a position to control the content of this activity must disclose any and all financial interests. The Academy has mechanisms in place to resolve all conflicts of interest prior to an educational activity being delivered to the learners.

The Academy requires all presenters to disclose on their first slide whether they have any financial interests from the past 12 months. Presenters are required to verbally disclose any financial interests that specifically pertain to their presentation.

Control of Content

The American Academy of Ophthalmology considers presenting authors, not coauthors, to be in control of the educational content. It is Academy policy and traditional scientific publishing and professional courtesy to acknowledge all people contributing to the research, regardless of CME control of the live presentation of that content. This acknowledgment is made in a similar way in other Academy CME activities. Though they are acknowledged, coauthors do not have control of the CME content, and their disclosures are not published or resolved.

Attendance Verification for CME Reporting

Before processing your requests for CME credit, the American Academy of Ophthalmology must verify your attendance at Subspecialty Day and/or AAO 2017. In order to be verified for CME or auditing purposes, you must either:

- Register in advance, receive materials in the mail, and turn in the *Subspecialty Day Syllabi* exchange voucher(s) onsite;
- Register in advance and pick up your badge onsite if materials did not arrive before you traveled to the meeting;
- Register onsite; or
- Scan the barcode on your badge as you enter an AAO 2017 course or session room.

CME Credit Reporting

Lobby B, Lobby G and Academy Resource Center, Hall G – Booth 3140

Attendees whose attendance has been verified (see above) at AAO 2017 can claim their CME credit online during the meeting. Registrants will receive an email during the meeting with the link and instructions on how to claim credit.

Onsite, you may report credits earned during Subspecialty Day and/or AAO 2017 at the CME Credit Reporting booth.

Academy Members: The CME credit reporting receipt is not a CME transcript. CME transcripts that include AAO 2017 credits entered onsite will be available to Academy members on the Academy's website beginning Dec. 7, 2017.

After AAO 2017, credits can be claimed at www.aao.org.

The Academy transcript cannot list individual course attendance. It will list only the overall credits spent in educational activities at Subspecialty Day and/or AAO 2017.

Nonmembers: The Academy will provide nonmembers with verification of credits earned and reported for a single Academy-sponsored CME activity, but it does not provide CME credit transcripts. To obtain a printed record of your credits, you must report your CME credits onsite at the CME Credit Reporting booths.

Proof of Attendance

The following types of attendance verification will be available during AAO 2017 and Subspecialty Day for those who need it for reimbursement or hospital privileges, or for nonmembers who need it to report CME credit:

- CME credit reporting/proof-of-attendance letters
- Onsite registration receipt
- Instruction course and session verification

Visit www.aao.org/cme for detailed CME reporting information.

Faculty



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Austin, TX



Vikram D Durairaj MD
Austin, TX



Jill Annette Foster MD FACS
Columbus, OH



Brett W Davies MD
San Antonio, TX



Bitia Esmaeli MD FACS
Houston, TX



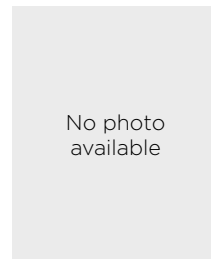
Andrew R Harrison MD
Minneapolis, MN



Raymond S Douglas MD PhD
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Patrick M Flaharty MD
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Eric M Hink MD
Aurora, CO



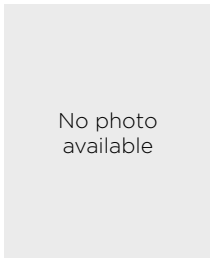
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Oculofacial Plastic Surgery 2017: Clinical Challenges and Surgical Technique—Strategies for Success in Oculofacial Plastic Surgery

In conjunction with the American Society of Ophthalmic Plastic and Reconstructive Surgery

7:00 AM	CONTINENTAL BREAKFAST		
8:00 AM	Welcome and Introductions	Vikram D Durairaj MD* Wendy W Lee MD*	
Section I: Aesthetics I			
Moderator: Ivan M Vreck MD			
8:05 AM	Canthoplasty—Minimally Invasive to Maximally Invasive	Dale R Meyer MD FACS Sean Matthew Blaydon MD	1
8:30 AM	Case Presentation: Nonsurgical Facial and Eyelid Rejuvenation	John Joseph Martin MD	2
8:40 AM	Neurotoxins	Jill Annette Foster MD FACS	3
8:55 AM	Fillers	Brett S Kotlus MD	4
9:10 AM	Lasers and Topicals	John Joseph Martin MD	5
9:25 AM	Panel Discussion		
9:35 AM	REFRESHMENT BREAK and AAO 2017 EXHIBITS		
Section II: Aesthetics II			
Moderator: Brian C Tse MD			
10:15 AM	Advocating for Patients	Philip R Rizzuto MD FACS*	6
10:20 AM	Case Presentation: Surgical Eyelid and Facial Rejuvenation	Tanuj Nakra MD*	8
10:30 AM	Upper Eyelid Blepharoplasty	Guy G Massry MD*	9
10:45 AM	Lower Eyelid Blepharoplasty	Patrick M Flaharty MD	10
11:00 AM	Cosmetic Ptosis	Ronald Mancini MD	11
11:15 AM	Brow Lifting	Tanuj Nakra MD*	12
11:30 AM	Panel Discussion		
11:40 AM	LUNCH and AAO 2017 EXHIBITS		
Section III: Orbit			
Moderators: Brett W Davies MD and Eric M Hink MD			
1:10 PM	Case Presentation and Expert Discussion: Orbital Lymphoma	Bitá Esmaeli MD FACS	13
1:30 PM	Case Presentation and Expert Discussion: Hemangioma of Infancy	Femida Kherani MD*	14
1:50 PM	Case Presentation and Expert Discussion: Tumors of the Lacrimal Gland	David T Tse MD FACS	15
2:10 PM	Panel Discussion		

* Indicates that the presenter has financial interest. No asterisk indicates that the presenter has no financial interest.

2:20 PM	Case Presentation and Expert Discussion: Orbital Cellulitis	Michael T Yen MD Thomas Edward Johnson MD	18
2:40 PM	Advances in Lacrimal Surgery: Minimally Invasive Conjunctivo-Dacryocystorhinostomy	Andrew R Harrison MD	19
2:55 PM	Advances in Lacrimal Surgery: Non-endoscopic Transnasal Dacryocystorhinostomy	Stephen J Laquis MD	20
3:10 PM	Controversies in Orbit Fracture Repair: Indications, Timing, Implant Choice	Peter A D Rubin MD	21
3:25 PM	Panel Discussion		
3:35 PM	REFRESHMENT BREAK and AAO 2017 EXHIBITS		

Section IV: Thyroid Eye Disease

Moderator: Raymond S Douglas MD PhD

4:10 PM	Case Presentation	Raymond S Douglas MD PhD	22
4:25 PM	Medical Management	Raymond S Douglas MD PhD	23
4:45 PM	Surgical Management	Raymond S Douglas MD PhD	24
5:05 PM	Panel Discussion		
5:15 PM	Closing Remarks	Wendy W Lee MD* Vikram D Durairaj MD*	

Canthoplasty: Minimally Invasive to Maximally Invasive

Lateral Canthoplasty: The Bick, Tarsal Strip, and Hybrid “Quick Strip” Procedure

Dale R Meyer MD FACS and Sean Matthew Blaydon MD

Eyelid Malpositions

Eyelid malpositions, including ectropion and entropion, are common in the aging population and may cause ocular irritation and exposure. Horizontal lid laxity is a frequent component in many cases. Older patients seeking aesthetic improvement may also have some degree of lid laxity, and an awareness of this is important, particularly for those patients considering lower lid blepharoplasty, midfacial or related periocular procedures. For patients with overt lid malposition or significant laxity, surgical treatment may be required. A variety of techniques have been described for correction of eyelid laxity, including the Bick procedure and the lateral tarsal strip.

The Bick procedure

As originally described in 1966, the Bick procedure involves a triangular excision of eyelid tissue with the apex directed inferiorly, no disruption of the lateral canthal tendon, and a somewhat complex closure similar to that for a full-thickness defect. Blunting and medial displacement of the lateral canthal angle as well as a high rate of wound separation diminished its general acceptance.

The lateral tarsal strip procedure

This procedure described by Anderson and others is well known to all of us and has become a popular procedure worldwide for correction of lid laxity. The procedure starts with a lateral canthotomy / cantholysis, followed by layered separation of the lid, excision of the anterior layer, shaving of the conjunctiva, suturing the tarsal strip to periosteum (typically with 2 sutures), and final closure. Favorable results have been obtained, although follow-up and specific complication rates have been less well documented in studies.

The “Quick Strip” procedure

We have used this hybrid of the Bick and lateral tarsal strip for several years. The quick strip also involves a triangular excision of eyelid tissue; however, the triangle is oriented with the apex more laterally, and initiated following a lateral canthotomy / cantholysis. We have found it to be technically easier, with fewer steps than the lateral tarsal strip, and the design allows it to be combined with other adjunctive procedures for more severe cases, such as suborbicularis oculi fat lift (SOOF) for coexistent midface descent, medial spindle for punctal ectropion, or tarsorrhaphy for exposure issues. The procedure will be described and demonstrated.

Quick Strip Study

This study included 225 eyelids in 160 patients over a 4-year period. Separate subgroup analysis was performed for patients who received adjunctive procedures such as SOOF lift or medial spindle. The overall results were quite favorable and will be briefly presented. When looking at the utility of the quick strip for correction of lid laxity per se, 96% of eyelids were felt to have adequate horizontal tightening. Symptomatic improvement was achieved in 95% of patients, and complications were infrequent. During the study period, there was only 1 late recurrence.

Conclusion

We have found the quick strip procedure to be an effective and efficient means for correcting horizontal eyelid laxity. It can easily be combined with adjunctive procedures as necessary, with a high degree of resultant patient satisfaction.

Case Presentation: Nonsurgical Facial and Eyelid Rejuvenation

John J Martin Jr MD

Evaluation

Wrinkling

- OnabotulinumtoxinA
- Fillers/fat
- Laser
- Topicals

Laxity

- Lasers/ultrasound
- Fillers/fat
- Topicals

Pigment

- IPL
- Lasers
- Topicals

Volume

- Fillers/fat

Neurotoxins

Cosmetic Botulinum Toxin Applications

Jill A Foster MD FACS

I. Introduction

Relevance of interest in cosmetic applications of botulinum toxin

- A. Statistics to summarize minimally invasive procedures
- B. Relative increase in volume of botulinum toxin injections over the period of availability
- C. Efficacy, safety profile, satisfaction ratings

II. Molecular and Clinical Differences in the Available Botulinum Toxins

- A. AbobotulinumtoxinA
- B. IncobotulinumtoxinA
- C. OnabotulinumtoxinA

III. Periocular and Cosmetic Applications

- A. Kinetic lines
- B. Position and contour
- C. Skin
- D. Scar
- E. Filler longevity
- F. Surgical adjuvant

- 1. Browlift
- 2. Chemical peel/laser

IV. Injection Techniques

- V. Strategies for Market Success

Fillers

Injectable Filler Strategies and Tactics

Brett Kotlus MD

- I. Strategies: What Are We Trying to Achieve as Aesthetic Providers?
 - A. Anti-aging vs. appearance modification / enhancement
 - B. How can we do this?
 - 1. Add something
 - 2. Remove something
 - 3. Reposition / move something
 - 4. Transform something via energy / chemical / biologic
- II. What Are Fillers?
 - A. Injectable implants
 - B. Manual, customized additive manufacturing (in vivo 3-D printing)
- C. Filler options
 - 1. Hyaluronic acid gel
 - 2. Calcium in carrier
 - 3. Polymethylmethacrylate (PMMA) in carrier
 - 4. Poly-L-lactic acid (PLLA)
 - 5. Off-label products
 - 6. Biologics
- III. Tactics
 - A. Choice of tools
 - B. Multimodal solutions
 - 1. Combining filler types
 - 2. Filler plus energy / surgery / other injectables
 - C. Case studies

Lasers and Topicals

John J Martin Jr MD

I. Topicals

A. Sunscreens

1. UVA and UVB protection
2. Sunblock: zinc and titanium

B. Antioxidants

1. Help to decrease free radicals and DNA damage
2. Botanicals

C. Moisturizers

D. Alpha hydroxy acid: glycolic, lactic for exfoliation and to increase hydration of skin

E. Retinoids: exfoliate, stimulate collagen synthesis, increase epidermal thickness

F. Lighteners: hydroquinone, kojic acid

II. Energy-Based Devices

To improve skin texture and color

A. Fully ablative lasers: CO₂ and erbium

1. Best results
2. Longer recovery time, more possible complications

B. Fractionated laser resurfacing

1. Nonablative: best for scars, mild improvements in wrinkling
2. Ablative: CO₂ and erbium
 - a. Get improvements in skin texture
 - b. Faster healing than fully ablative
 - c. Complications still possible

C. Intense pulsed light

1. Photorejuvenation: improvements in pigmentation and redness of skin
2. Hair removal

D. Radiofrequency: deep heating to stimulate collagen synthesis and tighten skin

E. Microneedling with radiofrequency

1. Needle trauma to stimulate collagen in addition to the deep radiofrequency
2. Good for scars and wrinkling

F. Microfocused ultrasound

1. Deep ultrasound to stimulate collagen synthesis to tighten skin
2. Can help to tighten neck and elevate brow

2017 Advocating for Patients

Philip R Rizzuto MD FACS

Ophthalmology's goal to protect sight and empower lives requires active participation in and commitment to advocacy from every ophthalmologist. Contributions to the following three critical funds are a part of that commitment:

- OPHTHPAC® Fund
- Surgical Scope Fund (SSF)
- State Eye PAC

Please join the dedicated community of ophthalmologists who are contributing to protect quality patient eye care for everybody. The OPHTHPAC Committee is identifying Congressional Advocates in each state to maintain close relationships with federal legislators in order to advance ophthalmology and patient causes. At Mid-Year Forum 2017, we honored nine of those legislators with the Academy's Visionary Award. This served to recognize them for addressing issues important to us and to our patients. The Secretariat for State Affairs is collaborating closely with state ophthalmology society leaders to protect Surgery by Surgeons at the state level. This year has seen an unprecedented effort by optometry to advance its scope of practice via legislation rather than education. Our mission of protecting sight and empowering lives requires robust funding of both the Surgical Scope Fund and the OPHTHPAC Fund. Each of us has a responsibility to ensure that these funds are strong.

OPHTHPAC® Fund

OPHTHPAC is a crucial part of the Academy's strategy to protect and advance ophthalmology's interests in key areas, including physician payments from Medicare and protecting ophthalmology from federal scope of practice threats. Established in 1985, OPHTHPAC is one of the oldest, largest, and most successful political action committees in the physician community. We are very successful in representing *your* profession to the U.S. Congress.

As one election cycle ends, a new one starts, yet the pressure to remain vocal on our issues remains. Advocating for our congressional issues is a continuous battle, and OPHTHPAC is always under financial pressure to support our incumbent friends as well as to make new friends with candidates. These relationships allow us to have a seat at the table with legislators willing to work on issues important to us and our patients.

The relationships OPHTHPAC builds with members of Congress is contingent on the financial support we receive from Academy members. Academy member support of OPHTHPAC allows us to advance ophthalmology's federal issues. We need to increase the number of our colleagues who contribute to OPHTHPAC and the other funds. Right now, major transformations are taking place in health care. To ensure that our federal efforts and our PAC remain strong, we need the support of every ophthalmologist to better our profession and ensure quality eye care for our patients.

The significant impacts that OPHTHPAC has made include the following:

- Derailed the onerous global surgery data collection proposal
- Preserved global surgical payments
- Halted the Part B Drug Demonstration
- Continued efforts in collaboration with subspecialty societies to preserve access to compounded and repackaged drugs such as Avastin

Contributions to OPHTHPAC can be made here at AAO 2017 or online at www.aao.org/opthtpac by clicking "Join."

Leaders of the American Society of Ophthalmic Plastic & Reconstructive Surgery (ASOPRS) are part of the Academy's Ophthalmic Advocacy Leadership Group (OALG), which meets every January in the Washington, D.C., area to provide critical input and to discuss and collaborate on the Academy's advocacy agenda. The topics discussed at the 2017 OALG agenda included panel discussions on the Merit Based Incentive Payment System (MIPS) and APM implementation, as well as Academy analysis initiatives related to the IRIS® registry. In addition, meeting participants discussed the changing paradigm for optometric scope battles, held a roundtable to discuss challenges for surgical subspecialties, and considered opportunities to ensure physician and patient choice regarding access to pharmaceuticals.

At Mid-Year Forum 2017, the Academy and ASOPRS ensured a strong presence of oculofacial plastic surgeons to support ophthalmology's priorities, and a record number of ophthalmologists visited members of Congress and their key health staff to discuss ophthalmology priorities as part of Congressional Advocacy Day. The ASOPRS remains a crucial partner with the Academy in its ongoing federal and state advocacy initiatives.

Surgical Scope Fund

The Surgical Scope Fund (SSF) provides grants to state ophthalmology societies to support their efforts to derail optometric surgery proposals that pose a threat to patient safety. Since its inception, the Surgery by Surgeons campaign and the SSF, in partnership with state ophthalmology societies, has helped 32 state / territorial ophthalmology societies reject optometric scope of practice expansion into surgery.

In 2017, your colleagues serving on the Academy's Secretariat for State Affairs, along with State Governmental Affairs staff and the leaders of state ophthalmology societies, have been put to the task while dealing with an unprecedented number of simultaneous legislative battles. Eleven states have been affected so far this year:

- Alaska
- California
- Florida
- Georgia
- Illinois
- Iowa
- Maryland
- Massachusetts
- Nebraska
- North Carolina
- Pennsylvania

Surgical Scope Fund	OPHTHPAC® Fund	State EyePAC
To derail optometric surgical scope of practice initiatives that threaten patient safety and quality surgical care	Ophthalmology's interests at the federal level Support for candidates for U.S. Congress	Support for candidates for state House, Senate, and governor
Political grassroots activities, lobbyists, PR and media campaigns	Campaign contributions, legislative education	Campaign contributions, legislative education
No funds may be used for campaign contributions or PACs.		
Contributions: Unlimited Individual, Practice, and Organization	Contributions: Limited to \$5,000	Contribution limits vary based on state regulations.
Contributions are 100% confidential.	Contributions above \$200 are on the public record.	Contributions are on the public record depending upon state statutes.

Patient safety setbacks as well as victories will be reviewed during the presentation, but do know that in each of these legislative battles, the benefits from SSF distributions are abundantly clear. The best lobbyists and public relations consultants are contracted as necessary, and media campaigns (including TV, radio, and social media) to educate the voting public are launched when needed to secure success and stop optometry from expanding its scope of practice to include surgery. Each of these endeavors is very expensive, and no one state has the resources to wage one of these battles on its own. Ophthalmologists must join together and donate to the SSF to fight for patient safety when a state faces a scope battle over optometric surgery.

The Academy relies not only on the financial contributions to the SSF from individual ophthalmologists and their practices, but also on the contributions made by ophthalmic state, subspecialty, and specialized interest societies. We thank the ASOPRS for contributing to the SSF in 2017 and look forward to their continued collaboration. Contributions to the SSF can be made here at AAO 2017 or online at www.aao.org/ssf.

State Eye PAC

It is also extremely important for all ophthalmologists to support their respective State Eye PACs because campaign contributions to legislators at the state level must come from individual ophthalmologists and cannot come from the Academy, OPHTHPAC, or the SSF. The presence of a strong State Eye PAC providing financial support for campaign contributions and legislative education to elect ophthalmology-friendly candidates to the state legislature is critical, as scope of practice battles and many regulatory issues are all fought on the state level.

Action Requested: ADVOCATE FOR YOUR PATIENTS

Academy SSF contributions are used to support the infrastructure necessary in state legislative / regulatory battles and for public education. PAC contributions are necessary at the state and federal level to help elect officials who will support the interests of our patients. Contributions to *each* of these three funds are necessary and help us protect sight and empower lives. SSF contributions are completely confidential and may be made with corporate checks or credit cards, unlike PAC contributions, which must be made by individuals and are subject to reporting requirements.

Please respond to your Academy colleagues and be part of the community that contributes to OPHTHPAC, the SSF, and

your State Eye PAC. Please be part of the community advocating for your patients now.

*OPHTHPAC Committee

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Upper Eyelid Blepharoplasty

Guy G Massry MD

Upper blepharoplasty has evolved significantly over the last 20 years, from a procedure that was founded only on the eyelid proper and on tissue excision to one that now focuses on the eyebrow and eyelid as an aesthetic unit, and in part on tissue preservation. This has been an essential paradigm shift in line with our more advanced awareness of facial aging arising as a combination of both tissue descent and deflation. In this talk the basic tenets of relevant upper eyelid and periorbital aging, eyelid anatomy, upper blepharoplasty surgical design, and technique will be outlined, with an emphasis on pearls for success. More contemporary procedures focused on tissue preservation and recreating an eyebrow / upper eyelid complex consistent with youth will be reviewed in detail.

Lower Eyelid Blepharoplasty

Pearls for Success

Patrick M Flaharty, John P Fezza MD

I. Background Observations

Lower eyelid blepharoplasty can be challenging. Matching the best approach to each individual is crucial. Surgeons are faced with the difficult task of choosing the correct technique to obtain the best aesthetic results. Preoperative assessment and planning is important to achieving pleasing and consistent outcomes. Understanding which procedure matches the patient as well mastering the surgical procedure enhances patient satisfaction.

II. Preoperative Assessment

- A. Use mirror to determine patient's concerns.
- B. Grade amount of fatty herniation / steatoblepharon.
- C. Measure lower lid crease distance from lid margin (lower lid length).
- D. Determine quality of skin and degree of wrinkling.
- E. Orbicularis muscle tone and presence of muscle roll on animation
- F. Crow's feet
- G. Lower lid position, scleral show, laxity (snap back and distraction tests)
- H. Presence and depth of tear trough
- I. Relationship of midface to lower lid (midface projection, negative vector, prominent globes)
- J. Slitlamp exam assessing for tear film, conjunctiva, fornix, and cornea

III. Lower Eyelid Techniques and Treatment Options

- A. Hyaluronic acid injections to tear troughs
- B. Laser skin resurfacing for wrinkles when no fat bag present
- C. Laser skin resurfacing with skin pinch for wrinkles and "jelly roll" with animation
- D. Transconjunctival fat removal for short vertical lids (< 13-mm length) with fat (plus laser or skin pinch)

- E. Transconjunctival fat sculpting with fat pearls or filler to tear trough vs. fat pedicle redraping for medium length lower lids (13 mm-16 mm)
- F. Transconjunctival fat sculpting and midface enhancement with fat injections for long lower lids (> 16 mm)
- G. Transcutaneous blepharoplasty with canthoplasty for excessive skin and fat
- H. Lateral canthal tightening with canthoplasty or -pexy for laxity

IV. Complications

- A. Bleeding
- B. Ectropion
- C. Chemosis
- D. Infection

V. Postoperative Care

- A. Cold packs
- B. No patches
- C. Antibiotic ointment
- D. Rest
- E. Elevate head of bed 45 degrees
- F. Limit alcohol and blood thinners

Selected Readings

1. Fezza J, Massry G. Lower eyelid length. *Plast Reconstr Surg.* 2015; 136(2):152e-159e.
2. Schwarcz R, Fezza J, Jacono A, Massry GG. Stop blaming the septum. *Ophthal Plast Reconstr Surg.* 2015; 31(6):488-489.
3. Fezza J. Non-surgical treatment of cicatricial ectropion with hyaluronic acid filler. *Plast Reconstr Surg.* 2008; 121(3):1009-1014.

Cosmetic Ptosis

Ronald Mancini MD

- I. Importance of Ptosis Recognition in Aesthetic Patients
- II. Evaluation of Ptosis Patients
 - A. Ptosis classification
 - B. Phenylephrine testing
 - C. Surgical options
- III. Posterior Approach to Aesthetic Ptosis
 - A. Surgical planning
 - B. Surgical technique
 - C. Outcomes

Selected Readings

1. Putterman AM, Urist MJ. Müller's muscle-conjunctival resection. Technique for treatment of blepharoptosis. *Arch Ophthalmol.* 1975; 93:619-623.
2. Vrcek I, Hogan RN, Rossen J, Mancini R. Conjunctiva-sparing posterior ptosis surgery: a novel approach. *Ophthal Plast Reconstr Surg.* 2016; 32(5):366-370.

Case Presentation and Expert Discussion: Orbital Lymphoma

Bita Esmaeli MD FACS

Orbital lymphoma is the most common primary malignant tumor of the orbit. Recent advances in diagnosis and treatment strategies for orbital lymphoma will be discussed with illustrative cases.

Case Presentation and Expert Discussion: Hemangioma of Infancy

Femida Kherani MD

Hemangiomas are the most common benign tumor of infancy, occurring in 1%-2% of all births. Hemangiomas are vascular neoplasms and affect 3 times more female children than male children. Hemangiomas are characterized by initial proliferation in the first year, with subsequent slow regression, typically 10% per year. Hemangiomas occur less frequently in Asian and African American children.

Classification is based on location. The majority (60%) of hemangiomas occur in the head and neck. Hemangiomas can affect the eyelid or eyebrow and may induce astigmatic anisometropia or occlusion amblyopia. Hemangiomas can also extend into the orbit, causing proptosis and optic neuropathy.

Hemangiomas are hamartomas—abnormal proliferations of normal tissue in an abnormal location. Positive staining with GLUT1 is diagnostic of classic hemangiomas. The majority of hemangiomas do not require neuroimaging for clinical confirmation. However, MRI is helpful in delineating the extent of the lesion.

Treatment is indicated for lesions that cause visual impairment—amblyopia, exposure keratopathy, optic neuropathy, and necrosis. The first line of treatment is oral beta-blockers, propranolol 2 mg/kg/day. Topical beta-blockers (0.25% timolol) b.i.d. may also be useful. Side effects of oral beta-blocker therapy include shortness of breath and bradycardia. Beta-blockers are vasoconstrictors and antiangiogenic, affecting VEGF and beta-fibroblast growth factor (FGF) genes.

Prior to 2008, the treatment of choice was oral or intral-
esional steroids. Surgical therapy is still indicated for bulky and persistent lesions that are refractory to medical therapy and threaten visual development.

Selected Readings

1. Drolet BA, Esterly NB, Frieden IJ. Hemangiomas in children. *N Engl J Med.* 1999; 341:173-181.
2. Drolet BA, Frommelt PC, Chamlin SL, et al. Initiation and use of propranolol for infantile hemangioma: report of a consensus conference. *Pediatrics* 2013; 131(1):128-140.
3. Chambers CB, Katowitz WR, Katowitz JA, Binenbaum G. A controlled study of topical 0.25% timolol maleate gel for the treatment of cutaneous infantile capillary hemangiomas. *Ophthalmol Plast Reconstr Surg.* 2012; 28(2):103-106.
4. Fries PD, Kazim M. Benign pediatric orbital tumors. In: Katowitz WR, ed. *Pediatric Oculoplastic Surgery.* New York: Springer; 2002.

Case Presentation and Expert Discussion: Tumors of the Lacrimal Gland

David T Tse MD FACS

I. Introduction

The lacrimal gland is the epicenter of a broad spectrum of neoplastic and inflammatory diseases. Information from clinical history, physical examination, ultrasonography, and radiographic soft tissue contour analysis forms the foundation in determining which category of disease the lacrimal gland tumor belongs to: inflammation, lymphoproliferative disorder, benign epithelial tumor, or malignant epithelial tumor. Acute presentation without contiguous bony changes is suggestive of inflammatory disorders. Insidious, painless onset (less than 1 year) in a senescent age group with radiographic evidence of a lesion molding or conforming to ocular and bony contours, rather than indenting adjacent structures, are hallmarks of lymphoproliferative diseases. Subacute presentation of short duration (usually 4 to 6 months) and radiographic evidence of infiltration of adjacent structures and calcification and irregular erosion or destruction of bone are indicative of malignant epithelial neoplasms. Chronic presentation without pain, associated with radiographic finding of lacrimal fossa remodeling, is suggestive of benign lacrimal gland tumors.

The focus of this presentation is to review the clinical characteristics, pertinent diagnostic and pathologic features, biological behavior, and conventional management protocols for the common epithelial lacrimal gland tumors: pleomorphic adenoma and adenoid cystic carcinoma. The rationale for a new globe-sparing strategy incorporating neoadjuvant intra-arterial chemotherapy as the core element in the treatment of adenoid cystic carcinoma is offered, and the short-term outcomes are reviewed. The future of orbital oncology will rely on elucidating the molecular dynamics to expand our precision oncology toolbox in targeting the dysregulation in cancer cells. New findings in bridging basic science, technology, and clinical practice will be discussed.

II. Pleomorphic Adenoma (Benign Mixed Tumor, BMT)

Pleomorphic adenoma, or benign mixed tumor, is the most common intrinsic lacrimal gland lesion, accounting for approximately 50% of the epithelial tumors. The tumor occurs in virtually every age group but most commonly in the third through seventh decades of life. The mean age at presentation is about 39 years. These tumors are derived from lacrimal gland ductules, stroma, or myoepithelial elements. Most arise from the deep orbital lobe; less commonly, the palpebral lobe is the site of origin. Rarely, pleomorphic adenomas arise from accessory or ectopic lacrimal gland tissue.

A. Clinical characteristics

1. Typically, the lesion presents as a painless, progressive, slow-growing mass or superotemporal swelling in the upper eyelid, with variable proptosis.
2. The direction of globe displacement is typically downward and outward.
3. Blurring of vision may be associated with induced astigmatism or myopic shift.
4. Gnawing orbital pain or inflammation is uncharacteristic for BMT.
5. Axial / coronal CT projections will display a round to oval, well-circumscribed lacrimal fossa mass, often with bony expansion and excavation, and an absence of bony destruction.
6. BMTs do not contour around the globe, like lymphoid or inflammatory lesions. Flattening or indentation of the globe and distortion of the muscle cone may be noted.
7. The term “mixed tumor” is derived from the combination of unusual mesenchymal elements (myxoid, chondroid, and osteoid) and double-layered tubular epithelial units.
8. Primary malignant mixed tumors of the lacrimal gland, although much less common, can also occur.

B. Conventional management

1. The most appropriate management of a BMT is complete surgical excision with an intact pseudocapsule via an anterolateral orbitotomy.
2. Incomplete or piecemeal removal or rupture of its pseudocapsule results in inevitable recurrence. Recurrence following incomplete excision usually takes a long time to manifest and may be associated with malignant degeneration.
3. Grossly, pleomorphic adenomas are pseudocapsulated tumors. They typically exhibit bosselations, which are small projections beyond the surface contour.

III. Adenoid Cystic Carcinoma of the Lacrimal Gland (LGACC)

Adenoid cystic carcinoma constitutes the most common nonlymphoid malignant tumor of the lacrimal gland, accounting for 25%-30% of epithelial lacrimal gland tumors. It has a bimodal distribution, with a peak incidence in the second and fourth decades of life, and there is no apparent sex predilection. This tumor tends not only to affect younger patients but also to confer the worst prognosis among the malignant tumors of the lacrimal gland.

A. Clinical characteristics

1. Patients usually complain of periocular pain, mild ptosis, and proptosis, along with downward and inward displacement of the globe. Pain is a predominant symptom due to perineural invasion and bone infiltration of the tumor. Other symptoms include brow numbness and diplopia. Symptoms typically have been present for around 6 months and almost always less than 1 year.
2. Due to the infiltrative growth pattern of this tumor, CT generally shows a globular mass with more irregular borders than an encapsulated pleomorphic adenoma. Other CT abnormalities included bone erosion, bone destruction, and soft tissue calcification. Tumor extension toward the medial orbit, apex, and the temporalis fossa is quite typical for adenoid cystic carcinoma. Posterior tumor extension toward the superior orbital fissure secondary to retrograde tracking along the lacrimal nerve is another aggressive behavior of this malignancy.

B. Biological behavior

1. Tends to invade nerves and lymphatic channels, resulting in microscopic spread
2. Local recurrence is common: soft tissue or orbital bone
3. Bone, lung, and liver are common foci of distant metastases.
4. Propensity for intracranial extension via the lacrimal nerve
5. Intracranial involvement is the principal cause of death.

C. Conventional treatment options

1. Local excision alone
2. Exenteration
3. Radiation alone
4. Exenteration + bone removal + radiation

D. Prognosis: Survival of less than 50% at 5 years and a dismal 20% at 10 years

E. Rationales for a new treatment approach

1. Since adenoid cystic carcinomas have a proclivity for microscopic perineural, soft tissue, and bone infiltration, the bounds of surgical excision may have been breached.
2. Surgery alone does not routinely effect a cure in high proportion.
3. Radiation therapy may “mop up” residual cancer cells, but tissue penetration by radiation can be a limiting factor.
4. Exenterations, exenteration combined with radiation, and radical cranio-orbital resection have not resulted in improved survival.

F. Neoadjuvant intra-arterial cytoreductive chemotherapy (IACC)

1. Based on unique lacrimal gland anatomy perfused by a single artery
2. Rationales for neoadjuvant IACC
 - a. Higher drug dose delivery to improve therapeutic index; overwhelms tumor repair mechanisms
 - b. Induces tumor necrosis
 - c. Minimizes dissemination of viable tumor cells during surgical manipulation
 - d. Reduces tumor size, rendering more amenable to achieving tumor margin clearance with exenteration
 - e. Eradicates tumor cells that may have escaped orbital confines, potentially spawning recurrence and metastases
3. A multidisciplinary IACC treatment protocol
 - a. Preoperative cytoreductive intra-arterial chemotherapy, 2 cycles
 - b. Conventional orbital exenteration
 - c. Postoperative intravenous chemotherapy, 4 cycles
 - d. Radiation therapy
 - e. Rationale for the 6 cycles of chemotherapy
 - i. Based upon the theoretic principle that at diagnosis a tumor has a population of approximately 10^{12} cells
 - ii. A highly effective (99%) chemotherapy regimen will kill 10^2 or 2 log-unit cells with each application.
 - iii. Thus, 6 applications ($10^2 \times 10^2 \times 10^2 \times 10^2 \times 10^2 \times 10^2 = 10^{12}$) would theoretically be required to effect a “cure.”

- G. New treatment paradigm: Integrated neoadjuvant IACC-based globe-sparing protocol
 - 1. Neoadjuvant IACC, 2 cycles
 - 2. En bloc tumor resection with preservation of globe
 - 3. Intensity-modulated radiation therapy (IMRT)
 - 4. 4 cycles of IV cisplatin and adriamycin
- H. Precision orbital oncology toolbox
 - 1. Assess tumorcidal effect of IACC-based globe-sparing strategy
 - 2. Personalize evaluation of patient-specific LGACC molecular drivers of cancer cell proliferation
 - 3. Identify molecular clues for microscopic metastasis or prevention of metastasis
 - 4. Tailor adjuvant therapies that specifically block molecular drivers of cancer cells
- I. Tools in toolbox to identify molecular drivers of cancer cells in excised LGACC tumor
 - 1. Apoptotic markers to survey tumor margins
 - 2. LGACC cell culture
 - 3. High throughput pharmacologic screening: In vitro testing for candidate drugs
 - 4. Xenograft transplant animal model: In vivo recapitulation of ACC tumor
 - 5. Exome sequencing of LGACC
 - 6. Unbiased screening of proteomic markers to identify potential targets for inhibition; fibroblast growth factor receptor (FGFR1) as a potential target for selective inhibition

Case Presentation and Expert Discussion: Orbital Cellulitis

Michael T Yen MD and Thomas Edward Johnson MD

Orbital cellulitis is a vision- and life-threatening emergency. Most cases occur in children and young adults and are associated with an adjacent paranasal sinusitis. Urgent hospital admission and intravenous antibiotic therapy is essential. Subperiosteal abscess formation can develop, requiring emergent surgical management. The majority of these collections occur along the medial orbital wall. However, some abscesses occur superiorly, and this subset of infections is much more dangerous, with a risk of intracranial extension, meningitis, and frontal lobe abscess. During this presentation, we will present a complicated case of orbital cellulitis with a superiorly located abscess. Treatment strategies will be reviewed, including causes, antibiotic selection, duration of antibiotic therapy, surgical approaches, complications, and multidisciplinary approaches to this disease.

Advances in Lacrimal Surgery: Minimally Invasive Conjunctivo-Dacryocystorhinostomy

Andrew R Harrison MD

- I. Conjunctivo-Dacryocystorhinostomy (CDCR)
 - A. Indications
 - B. Traditional approach
- II. Minimally Invasive CDCR
 - A. Technique
 - B. Complications
- III. Jones Tubes
 - A. History
 - B. Complications
 - C. Modifications to prevent extrusion
 - D. New Jones tube technology
 - 1. Frosted Jones tubes
 - 2. StopLoss Jones tube

Selected Readings

1. Devoto MH, Bernardini FP, de Conciliis C. Minimally invasive conjunctivodacryocystorhinostomy with Jones tube. *Ophthalm Plast Reconstr Surg.* 2006; 22(4):253-255.
2. Ahn ES, Dailey RA, Radmall B. The effectiveness and long-term outcome of conjunctivodacryocystorhinostomy with frosted Jones tubes. *Ophthalm Plast Reconstr Surg.* 2017; 33(4):294-299.

Advances in Lacrimal Surgery: Non-endoscopic Transnasal Dacryocystorhinostomy

Stephen J Laquis MD

- I. Historical Perspective: Early Development of Dacryocystorhinostomy (DCR)
 - A. External approach
 - 1. Technique
 - 2. Pros and cons
 - B. Internal approach
 - 1. Endoscopic
 - a. Technique
 - b. Pros and cons
 - 2. Non-endoscopic transnasal
 - a. Technique
 - b. Pros and cons
- II. Surgical Technique
 - A. Direct visualization
 - B. Necessary instrumentation
 - C. Anesthesia considerations
- III. Risk / Benefit
 - A. Patient selection
 - B. Skill / learning curve
 - C. Cost
 - D. Managing potential complications

Controversies in Orbit Fracture Repair: Indications, Timing, Implant Choice

Peter A D Rubin MD

- I. Orbital Fractures
 - A. Classification
 1. Bony considerations
 2. Soft tissue considerations
 - B. Examination considerations
 1. Orbital hemorrhage
 2. Globe position
 3. Extraocular motility limitation
- II. Orbital Imaging: CT
 - A. Low dose
 - B. Axial acquisition, multiplanar reconstruction
 - C. Reconstructions: coronal, parasagittal, 3-D
 - D. Improved resolution
 1. With CT reconstructions, rare to see intraoperative surprises
 2. Soft tissue analysis
 3. Torsion, displacement of extraocular muscles (EOM)
 4. Can be used to help choose / customize implant prior to surgery
- III. Surgical Repair: Indications
 - A. Orbital considerations
 1. Large fracture, > 50% of floor
 2. Extraocular muscle entrapment
 - a. Fascia, fibro-adipose tissue vs. EOM entrapment
 - b. Entrapment is a clinical not a radiologic finding.
 - B. Non-orbital considerations: Facial, nasal deformity, pan-facial fracture, frontal sinus: depressed anterior, posterior table fracture, trismus
- IV. Timing
 - A. Urgent < 24 hour: white eye blowout
 1. Severe entrapment, vasovagal
 2. More commonly in pediatric population
 3. CT may be deceiving.
 - B. Early, 1-4 days
 1. Pan-facial fracture
 2. Open fracture
- C. Subacute: 5 days to 3 weeks
 1. Large internal orbital fracture, zygomatic fracture
 2. Advantage of delayed, subacute repair: diminished soft tissue swelling
- D. Late: > 3 weeks
 1. Less desirable as it is harder to mobilize bones and soft tissue
 2. Surgical approach
 3. Orbital floor fracture
- V. Orbital Fracture Controversy
 - A. Transconjunctival: without vs. with lateral canthotomy / inferior cantholysis
 - B. Periosteal closure
 - C. Zygomatic complex repair

Single incision (lateral canthotomy, inferior / superior cantholysis) vs. multiple incisions (fronto-zygomatic suture line, orbital floor, transoral)
 - D. Implant choice: autogenous vs. alloplastic
 1. Alloplastic: plastic (porous vs. nonporous) vs. absorbable vs. metallic
 2. Noncustom vs. custom implant
 3. Cost

Selected Readings

1. Chang EL, Hatton MP, Bernardino CR, Rubin PA. Simplified repair of zygomatic fractures through a transconjunctival approach. *Ophthalmology* 2005; 112(7):1302-1309.
2. Jordan DR, Allen LH, White J, et al. Intervention within days for some orbital floor fractures: the white-eyed blowout. *Ophthalm Plast Reconstr Surg*. 1998; 14(6):379-390.
3. Mahoney NR, Peng MY, Merbs SL, Grant MP. Virtual fitting, selection, and cutting of preformed anatomic orbital implants. *Ophthalm Plast Reconstr Surg*. 2017; 33(3):196-201.
4. Stewart MG, Patrinely JR, Appling WD, Jordan DR. Late proptosis following orbital floor fracture repair. *Arch Otolaryngol Head Neck Surg*. 1995; 121(6):649-652.
5. Bernardini FP, Nerad J, Fay A, et al. The revised direct transconjunctival approach to the orbital floor. *Ophthalm Plast Reconstr Surg*. 2017; 33(2):93-100.

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