Oculofacial Plastic Surgery 2016
Beauty and the Beast: From Aesthetics to Advanced Orbital Disease

Program Directors
Andrew R Harrison MD and Vikram D Durairaj MD

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

McCormick Place
Chicago, Illinois
Saturday, Oct. 15, 2016

Presented by:
The American Academy of Ophthalmology
2016 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 Chicago and Oculofacial Plastic Surgery 2016: Beauty and the Beast—From Aesthetics to Advanced Orbital Disease.

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Program Director
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Bausch+Lomb: C
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InnFocus: C
Ivantis: C | Mynosys: C
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Oculofacial Plastic Surgery 2016 Contents

Program Planning Group  ii
CME  vi
Faculty Listing  viii
Program Schedule  xii
Section I: Aesthetic Surgery—How to Achieve High Reward With Low Risk  1
Advocating for Patients  9
Section II: Nonsurgical Aesthetics—How to Achieve High Reward With Low Risk  11
Section III: Orbit  28
Section IV: Trauma  38
Faculty Financial Disclosure  47
Presenter Index  49
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, or 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.

2016 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 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 patient management around the world

2016 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.

2016 Oculofacial Plastic Surgery Subspecialty Day 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 American Academy of Ophthalmology 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.

Self-Assessment Credit
This activity meets the Self-Assessment CME requirements defined by the American Board of Ophthalmology (ABO). Please be advised that the ABO is not an accrediting body for purposes of any CME program. The ABO does not sponsor this or any outside activity, and the ABO does not endorse any particular CME activity. Complete information regarding the ABO Self-Assessment CME Maintenance of Certification requirements is available at http://abop.org/maintain-certification/part-2-lifelong-learning-self-assessment/sacme/

NOTE: Credit designated as “self-assessment” is AMA PRA Category 1 Credit™ and is also preapproved by the ABO for the Maintenance of Certification (MOC) Part II CME requirements.

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 Academy considers presenting authors, not co-authors, 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 acknowledgement is made in a similar way in other Academy CME activities. Though they are acknowledged, co-authors 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 Academy must verify your attendance at Subspeciality Day and/or AAO 2016. 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 Subspeciality 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 2016 course or session room.

**CME Credit Reporting**

**Academy Resource Center, Hall B – Booth 508 and South Level 2.5**

Attendees whose attendance has been verified (see above) at AAO 2016 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 2016 at the CME Credit Reporting booth.

**Academy Members:** The CME credit reporting receipt is not a CME transcript. CME transcripts that include AAO 2016 credits entered onsite will be available to Academy members on the Academy’s website beginning Nov. 10, 2016.

After AAO 2016, credits can be claimed at www.aao.org/cme.

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 2016.

**Nonmembers:** The Academy will provide nonmembers with verification of credits earned and reported for a single Academy-sponsored CME activity.

**Proof of Attendance**

The following types of attendance verification will be available during AAO 2016 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 Listing

2016 Subspecialty Day  |  Oculofacial Plastic Surgery

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University of Queensland
Senior Medical Officer
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Associate Professor of Ophthalmology
University of California, San Francisco

Steven Gregg Yoelin MD
Santa Ana, CA

Julie A Woodward MD
Durham, NC
# Oculofacial Plastic Surgery 2016: Beauty and the Beast—From Aesthetics to Advanced Orbital Disease

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

**SATURDAY, OCT. 15**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Presenter(s)</th>
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<tbody>
<tr>
<td>7:00 AM</td>
<td>CONTINENTAL BREAKFAST</td>
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<tr>
<td>8:00 AM</td>
<td>Welcome and Introductions</td>
<td>Andrew R Harrison MD</td>
</tr>
<tr>
<td>8:05 AM</td>
<td>Comprehensive Evaluation of the Aesthetic Patient</td>
<td>Dong Jun Park MD</td>
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<tr>
<td>8:15 AM</td>
<td>Upper Blepharoplasty: Pearls for Success</td>
<td>John Bryan Holds MD*</td>
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<tr>
<td>8:25 AM</td>
<td>Lower Blepharoplasty: Pearls for Success</td>
<td>John P Fezza MD*</td>
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<td>8:35 AM</td>
<td>Midface Lifting: Pearls for Success</td>
<td>Robert M Schwarz MD*</td>
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<tr>
<td>8:45 AM</td>
<td>Aesthetic Browlifting: Pearls for Success</td>
<td>Tanuj Nakra MD</td>
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<tr>
<td>8:55 AM</td>
<td>A Personal Approach to Managing Aesthetic Surgery Complications</td>
<td>Don O Kikkawa MD</td>
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<tr>
<td>9:05 AM</td>
<td>Case Presentation #1</td>
<td>Dong Jun Park MD</td>
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<tr>
<td>9:15 AM</td>
<td>Case Presentation #2</td>
<td>Dong Jun Park MD</td>
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<tr>
<td>9:25 AM</td>
<td>Advocating for Patients</td>
<td>John B Holds MD*</td>
</tr>
<tr>
<td>9:30 AM</td>
<td>REFRESHMENT BREAK and AAO 2016 EXHIBITS</td>
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**Section I: Aesthetic Surgery—How to Achieve High Reward With Low Risk**

Moderator: Dong Jun Park MD

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<tbody>
<tr>
<td>10:10 AM</td>
<td>Neurotoxin 101: Foundations for Success</td>
<td>Amjad Z Ahmad MD</td>
</tr>
<tr>
<td>10:20 AM</td>
<td>Facial Shaping With Neurotoxins</td>
<td>Steven Gregg Yoelin MD*</td>
</tr>
<tr>
<td>10:40 AM</td>
<td>Fillers 101: Foundations for Success</td>
<td>Julie A Woodward MD*</td>
</tr>
<tr>
<td>10:50 AM</td>
<td>Facial Shaping With Fillers</td>
<td>Jose R Montes MD*</td>
</tr>
<tr>
<td>11:10 AM</td>
<td>Complications of Fillers</td>
<td>Catherine J Hwang MD*</td>
</tr>
<tr>
<td>11:20 AM</td>
<td>Case Presentation: Filler Patient Evaluation and Treatment</td>
<td>Wendy W Lee MD*</td>
</tr>
<tr>
<td>11:30 AM</td>
<td>Case Presentation: Filler Complication</td>
<td>Wendy W Lee MD*</td>
</tr>
<tr>
<td>11:40 AM</td>
<td>LUNCH and AAO 2016 EXHIBITS</td>
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**Section II: Nonsurgical Aesthetics—How to Achieve High Reward With Low Risk**

Moderator: Wendy W Lee MD*

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<tr>
<td>1:10 PM</td>
<td>Intraoperative Navigation for Orbital Surgery: Indications and Technique</td>
<td>Grant D Gilliland MD</td>
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<tr>
<td>1:20 PM</td>
<td>Orbital Decompression: Expanding Indications</td>
<td>Raymond S Douglas MD PhD</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>Endoscopic Approach to Orbital Surgery</td>
<td>Suzanne K Freitag MD</td>
</tr>
<tr>
<td>1:40 PM</td>
<td>Questions and Discussion</td>
<td>David R Jordan MD</td>
</tr>
<tr>
<td>1:50 PM</td>
<td>Management of Orbital Invasion of Skin Cancers</td>
<td>Martin H Devoto MD</td>
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</table>

* Indicates that the presenter has financial interest.
No asterisk indicates that the presenter has no financial interest.
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<th>Time</th>
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<tr>
<td>2:00 PM</td>
<td>Pediatric Orbital Tumors: Update on Diagnosis and Management</td>
<td>Timothy J Sullivan MBBS</td>
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<td>2:10 PM</td>
<td>Management of Orbital Lymphangiomas</td>
<td>Kenneth V Cahill MD FACS</td>
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<tr>
<td>2:20 PM</td>
<td>Questions and Discussion</td>
<td>David R Jordan MD</td>
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<tr>
<td>2:30 PM</td>
<td>Evisceration: Pearls for Success</td>
<td>Don Liu MD</td>
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<tr>
<td>2:40 PM</td>
<td>Enucleation: Pearls for Success</td>
<td>David R Jordan MD</td>
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<td>REFRESHMENT BREAK and AAO 2016 EXHIBITS</td>
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<td><strong>Section IV: Trauma</strong></td>
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<td>Moderator: Robert C Kersten MD</td>
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<td>3:30 PM</td>
<td>Orbital Imaging 2016</td>
<td>Jurij R Bilyk MD</td>
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<td>3:40 PM</td>
<td>Pediatric Orbital Trauma</td>
<td>Louise A Mawn MD</td>
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<td>3:50 PM</td>
<td>Complex Craniofacial Trauma: An Oculofacial Plastic Surgeon’s</td>
<td>Hui Bae Harold Lee MD</td>
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<td></td>
<td>Perspective</td>
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<td>4:00 PM</td>
<td>Controversies in the Management of Blowout Fractures</td>
<td>Michael A Burnstine MD</td>
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<tr>
<td>4:10 PM</td>
<td>Questions and Discussion</td>
<td>Robert C Kersten MD</td>
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<tr>
<td>4:20 PM</td>
<td>Traumatic Ptosis: Treatment Recommendations</td>
<td>Bobby S Korn MD PhD FACS*</td>
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<tr>
<td>4:30 PM</td>
<td>Modern-day Management of Canalicular Lacerations</td>
<td>M Reza Vagefi MD</td>
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<td>4:40 PM</td>
<td>Lower Lid Retraction: Choosing the Right Implant</td>
<td>Eric A Steele MD</td>
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<td>Questions and Discussion</td>
<td>Robert C Kersten MD</td>
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<tr>
<td>5:00 PM</td>
<td>Closing Remarks</td>
<td>Vikram D Durairaj MD*</td>
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No asterisk indicates that the presenter has no financial interest.
Comprehensive Evaluation of the Aesthetic Patient

Dong Jun Park MD

I. Listen!!
   Goals and expectations

II. Medical Considerations
   A. Fitness for anesthesia
   B. Anticoagulation
   C. Immunosuppression
   D. Smoking

III. Psychiatric Considerations

IV. Social Considerations
   A. Occupation
   B. Acute family / work stressors

V. Examination
   A. Facial asymmetry
   B. Skin quality / character

   C. Upper lid / brow
      1. Resting brow position
      2. Forehead / hairline
      3. Brow contour / volume
      4. Projection of globe relative to orbital rim / superior sulcus
      5. Dermatochalasis
      6. Ptosis

   D. Lower lid / cheeks
      1. Lower lid tone / canthal angle
      2. Projection of globe relative to bony and soft tissue malar projection
      3. Degree of steatochalasis
      4. Evaluation of tear trough and midface soft tissue
Upper Blepharoplasty: Pearls for Success

John B Holds MD

I. Medical History
   A. Confounding medications and medical conditions
   B. Elicit anticoagulant history
   C. Ocular history and dry eye symptoms
   D. Carefully note patient’s functional and cosmetic concerns

II. Evaluation
   A. Visual acuity
   B. Basic Schirmer
   C. Slitlamp examination
   D. Visual field: Functional must generally show 20° improvement and/or superior suprathreshold field reduced to < 30° untaped.

III. External Examination
   A. Skin type, dermatoses or lesions
   B. Brow position/frontalis tone
   C. Severity of dermatochalasis
   D. Eyelid height (margin to reflex distance [MRD]-1)
   E. Levator function
   F. Lid crease height and contour
   G. Fat prolapse and medial fat pad
   H. Lagophthalmos, lid retraction, or facial weakness

IV. Coexisting Conditions
   A. Brow ptosis
   B. Blepharoptosis
   C. Eyelid retraction/exophthalmos

V. Complaints Addressed
   A. Functional
      1. Visual obstruction
      2. Overhanging skin
      3. Trichiasis/dermatitis
   B. Cosmetic
      1. Roll of skin obscures pretarsal platform
      2. Unsightly bulging fat
      3. Indistinct lid crease
      4. Secondary issues from brow ptosis
      5. Asymmetries

VI. Surgical Goals
   A. Redrape overhanging upper lid skin
   B. Recontour supratarsal fold
   C. Improve symmetry by matching
      1. Tarsal platform show
      2. Lid height (MRD-1)
      3. Lid crease height and contour
      4. Brow height
      5. Brow fat span
      6. Contour and volume of eyelid and brow

VII. Aesthetic Goals
   A. Repair or mask deflation
   B. Lessen overhanging skin
   C. Smooth bulging fat
   D. Natural, safe, and conservative

VIII. Surgical Technique
   A. Mark upright in preoperative area with fine-tip marker (see Figure 1).
   B. Eyelid crease 8-11 mm central
   C. Crease 4-5 mm medial, 5-7 mm lateral.

Figure 1. Reprinted from Holds, 2010.1
D. For upper mark, look at amount of skin removed and amount remaining.
E. Leave 20 mm total skin vertically (lid margin-crease + crease-brow).
F. ± pinch technique
G. Local anesthetic: 2% lidocaine with epinephrine 1:100,000, ± initial diluted injection
H. Incise #15 blade
I. Remove skin only medial to punctum, lateral to lateral canthal angle.
J. Consider excision strip muscle over central eyelid.

K. ± open orbital septum, local anesthetic to fat if addressed, generous cautery
L. ± fat excision. Consider medial pad, lateral tail only, no central eyelid fat.

M. Meticulous hemostasis
N. Closure with fine running 7-0 polypropylene suture
O. Postoperative ice x 48 hours; ointment to incisions, q.i.d.; eye, nightly at bedtime
P. Suture removal 6-10 days

Reference
Lower Blepharoplasty: Pearls for Success

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 are important to achieving pleasing and consistent outcomes. Understanding which procedure matches the patient and mastering the surgical procedure are key to enhancing 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. 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

Cold packs, no patches, antibiotic ointment, rest, elevate HOB 45 degrees, limit alcohol and blood thinners

Selected Readings

Midface Lifting: Pearls for Success

Robert M Schwarcz MD
Aesthetic Browlifting: Pearls for Success

Tanuj Nakra MD
A Personal Approach to Managing Aesthetic Surgery Complications

Don O Kikkawa MD FACS

I. Understand why complications occur
   A. Preoperative Planning
   B. Technique
   C. Intraoperative Judgment
   D. Unknown causes

II. Prevention is the best cure
   A. Management of expectations
   B. Adequate preoperative assessment
   C. Informed consent

III. Spectrum of complications
   A. Vision threatening
      1. Hemorrhage
      2. Globe or optic nerve injury
   B. Non-vision threatening
      1. Patient perceived
      2. Objective assessment of surgical result and functional issues

IV. What to do once they occur
   A. Understand wound healing
   B. Revisional procedures
Case Presentation #1

*Dong Jun Park MD*

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NOTES

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Case Presentation #2

*Dong Jun Park MD*

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NOTES

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2016 Advocating for Patients

John B Holds MD

Ophthalmology’s goal to protect sight and empower lives requires active participation with and commitment to advocacy efforts. Contributions to the following three critical funds by all ophthalmologists is part of that commitment:

1. OPHTHPAC® Fund
2. Surgical Scope Fund (SSF)
3. State Eye PAC

Your ophthalmologist colleagues serving on Academy committees—the Surgical Scope Fund Committee, the Secretariat for State Affairs, and the OPHTHPAC Committee—are dedicating significant time to advocating for patients and the profession. 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. The Secretariat for State Affairs is collaborating closely with state ophthalmology society leaders to protect Surgery by Surgeons at the state level. Both groups require robust funds from both the Surgical Scope Fund and the OPHTHPAC Fund in order to protect quality patient care.

These committed ophthalmologists serving on your behalf have a simple message to convey: “It takes the entire community of ophthalmologists” to be effective.

- We need each member of the ophthalmology community to contribute to each of these 3 funds.
- We need each member of the ophthalmology community to establish relationships with state and federal legislators.
- We need each member of the ophthalmology community to make a commitment to protect quality patient eye care and the profession.

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 as well as 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. 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 and legislators willing to work on issues important to us and our patients.

For the past year, the media and the country have focused on the U.S. presidential primaries. But the races most important to ophthalmology involve seats in Congress. The entire House of Representatives and one-third of the Senate is up for election. Several physicians need our help—and we have many new friends to make.

In order for ophthalmology to remain seated at the table, we need to be heavily invested in this year’s election. That takes investment by each member of the ophthalmology community, whether with time or money. Currently, only a minority of ophthalmologists have realized the vital importance of contributing to OPHTHPAC and the other funds. Right now, major transformations are taking place in health care and we need participation from the majority of ophthalmologists so that we have the resources to better our profession and ensure quality eye care for our patients.

Among the significant impacts made by OPHTHPAC are the following:

- Repealed the flawed Sustainable Growth Rate (SGR) formula
- Blocked the unbundling of Medicare global surgery payments
- Removed a provision in Medicare fraud and abuse legislation that targeted eyelid surgery
- Working to reduce the burdens from Medicare’s existing quality improvement programs, such as the EHR Meaningful Use program
- Working in collaboration with subspecialty societies to preserve access to compounded and repackaged drugs such as Avastin
- Working to get the Centers for Medicare and Medicaid Services to revisit drastic Medicare fee cuts to glaucoma and retinal detachment surgeries
- Working to protect your ability to perform in-office ancillary services in your office

Contributions to OPHTHPAC can be made here at AAO 2016 or online at www.aao.org/ophthpac.

Leaders of the American Society of Ophthalmic Plastic & Reconstructive Surgery (ASOPRS) are part of the American Academy of Ophthalmology’s Ophthalmic Advocacy Leadership Group (OALG), which has met for the past nine years in January in the Washington, DC, area to provide critical input and to discuss and collaborate on the Academy’s advocacy agenda. The topics discussed in the 2016 OALG agenda included the impact of the Medicare Access and the CHIP Reauthorization Act (MACRA); the IRIS™ Registry and quality reporting under Medicare; data transparency and public reporting; and a roundtable to discuss challenges for surgical specialties. At Mid-Year Forum 2016, the Academy and ASOPRS ensured a strong presence of oculofacial plastic and reconstructive 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 (SSF)

The Surgical Scope Fund (SSF) provides grants to state ophthalmology societies to support their legislative, regulatory, and public education efforts to derail optometric surgery proposals that pose a threat to patient safety, quality of surgical care, and surgical standards. Since its inception, the Surgery by Surgeons campaign—in partnership with state ophthalmology societies
Advocating for Patients

<table>
<thead>
<tr>
<th>Surgical Scope Fund</th>
<th>OPHTHPAC® Fund</th>
<th>State EyePAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>To derail optometric surgical scope of practice initiatives that threaten patient eye safety and quality of surgical care</td>
<td>Ophthalmology's interests at the federal level / support for candidates for U.S. Congress</td>
<td>Support for candidates for State House and Senate</td>
</tr>
<tr>
<td>Political grassroots activities, lobbyists, and media; No funds may be used for candidates or PACs.</td>
<td>Campaign contributions, legislative education</td>
<td>Campaign contributions, legislative education</td>
</tr>
<tr>
<td>Contributions: Unlimited</td>
<td>Contributions: Limited to $5,000</td>
<td>Contribution limits vary based on state regulations.</td>
</tr>
<tr>
<td>Individual, practice, and organization</td>
<td>Contributions above $200 are on the public record.</td>
<td>Contributions are on the public record depending upon state statutes.</td>
</tr>
</tbody>
</table>

and with support from the SSF—has helped 32 state / territorial ophthalmology societies reject optometric scope of practice expansion into surgery.

In 2016, thanks to Surgical Scope Fund support by Academy members and tireless advocacy by state ophthalmology society leaders, ophthalmology continues to champion surgical safety at state capitols across the country. State ophthalmological societies and the Academy’s Secretariat for State Affairs faced eight concurrent Surgery by Surgeons battles, in Alaska, California, Delaware, Illinois, Iowa, Massachusetts, Pennsylvania, and Puerto Rico.

In each of these legislative battles, the benefits from Surgical Scope Fund distributions are crystal clear. The fund has allowed for successful implementation of patient safety advocacy campaigns, which result in defeating attempts by optometry to expand their scope of practice to include surgery.

The Academy relies not only on the financial contributions to the Surgical Scope Fund from individual ophthalmologists and their practices, but also on the contributions made by ophthalmic state, subspecialty, and specialized interest societies. The ASOPRS contributed to the Surgical Scope Fund in 2015, and the Academy counts on its contribution in 2016.

Contributions to the SSF can be made here at AAO 2016 or online at www.aao.org/ssf.

**State Eye PAC**

It is also important for all ophthalmologists to support their respective State Eye PACs because PAC contributions to legislators at the state level must come from individual ophthalmologists and cannot come from the Academy, OPHTHPAC, or the Surgical Scope Fund. 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 Surgical Scope Fund 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. Surgical Scope Fund 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 Surgical Scope Fund, and your State Eye PAC. Please be part of the community advocating for your patients now.

**OPHTHPAC Committee**

Donald J Cinotti MD (NJ) – Chair
Janet A Betchkal MD (FL)
William S Clifford MD (KS)
Sidney K Gicheru MD (TX)
Michael L Gilbert MD (WA)
Gary S Hirshfield MD (NY)
David W Johnson MD (CO)
Jeff Maltzman MD (AZ)
Lisa Nijm MD JD (IL)
John D Roarty MD (MI)
Diana R Shiba MD (CA)
Woodford S Van Meter MD (KY)
John (“Jack”) A Wells III MD (SC)
Charles M Zacks MD (ME)

**Surgical Scope Fund Committee**

Kenneth P Cheng MD (PA) – Chair
Matthew F Appenzeller MD (NC)
Ronald A Braswell MD (MS)
John P Holds MD (MO)
Cecily A Lesko MD FACS (NJ)
C Blake Myers MD (SC)
William (“Chip”) W Richardson II MD (KY)
David E Vollman MD MBA (MO)

**Ex Officio Members**

Daniel J Briceland MD (AZ)
David W Parke II MD (CA)
Michael X Repka MD (MD)
William L Rich III MD FACS (VA)
George A Williams MD (MI)

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**Ex Officio Members**

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Kurt F Heitman MD (SC)
Neurotoxin 101: Foundations for Success

Amjad Z Ahmad MD

I. Botulinum Toxin: Clostridium botulinum
   A. 8 serotypes, A-G
   B. All active in humans, with A and B used clinically
   C. A is the most potent of all 8 serotypes.

II. These neurotoxins work on the neuromuscular junction by inhibiting the release of acetylcholine, which causes muscle weakness or paralysis.

III. Serotype A
   A. OnabotulinumtoxinA: Botox (Allergan)
   B. AbobotulinumtoxinA: Dysport (Ipsen)
   C. IncobotulinumtoxinA: Xeomin (Merz)
   D. Differences in dosing: 20 units of Botox = 60 units of Dysport

IV. Preparation
   A. Botulinum toxin will be delivered to your office on dry ice and then should be refrigerated.
   B. Inject preservative-free saline into botulinum toxin. The amount of saline used will determine the concentration. In general, most ophthalmic injectors are using a 4-cc dilution. This will give a 2.5 unit/0.1 cc concentration.
   C. After preparation, it should be kept refrigerated. Botulinum toxin preparation can be drawn up prior to patient appointment. Usually 20 units/syringe (0.8 cc into each of 5 syringes). Use syringes with smooth plunger activity so as to avoid waste. Small-caliber needles for injection (30- or 32-gauge needles).

V. Consent/Photography
   A. Common discussion points should include risk of bruising, pain at the injection site, dry eye symptoms, diplopia, and ptosis.
   B. Patients with history of dry eye, previous eyelid surgery / lasers, or previous neurotoxin injections may have worsening of dry eye symptoms or lid malpositions.
   C. Botulinum toxins will improve lines but not erase them. The best results are achieved when patients receive injections consistently every 4 to 6 months. Fillers may be needed to augment the results if deep lines are the problem.

VI. Preinjection Tips
   A. Clean skin with gentle wipes (Cetaphil) or alcohol wipes

B. Marking patient with washable marker
C. Topical anesthetic (prilocaine)
D. Other pain control options include icing area prior to injection or use of handheld balls to squeeze or even hand holding.
E. Patients should stop blood thinners (if possible) prior to injections.
F. Arnica (Sineech) can be started several days prior to injections.

VII. Injection Patterns Individualized for Each Patient
   A. Remember that botulinum toxins diffuse in the area around the injection.
   B. Periorbital anatomy
      1. Orbicularis muscle: horizontal rhytides in lateral canthal area
      2. Corrugator muscle: Vertical rhytides in glabella
      3. Procerus muscle: horizontal rhytides in nasal bridge
      4. Frontalis muscle: horizontal rhytides on forehead
   C. Crows feet: Usually 3 injections; can add another in lower eyelid for lower eyelid fold (total 7.5 to 10 units). May need additional units if patient has significant rhytides.
   D. Glabella: Usually 5 injections, starting just medial to supraorbital notch (15 to 20 units). Don’t inject too close to supraorbital rim.
   E. Forehead: Stay 2 cm above brow and use 1-2 units per site, depending on size of forehead and amount of lines (10 to 20 units). (Some patients may require higher doses.)
   F. Overtreatment of frontalis muscle can cause brow ptosis and worsening of dermatochalasis.

VIII. Post-injection Follow-up
   A. Offer patients ability to return for touch-up in 1 month if needed.
   B. For any complications like bad bruising, diplopia, or ptosis have patient return for follow-up and photograph.
   C. Take post-injection photo at next injection appointment.

IX. Common Issues Following Injection
   A. Spock brows: Treatment = 1-2 units in frontalis in area of high arch of brow
B. Worsening of dermatochalasis or asymmetric brow ptosis from overtreatment of frontalis muscle

C. Eyelid ptosis: Treat with apraclonidine (Iopidine) 0.5% or naphazoline hydrochloride and pheniramine maleate eye drops (Naphcon-A)

D. Undercorrection: Increase dosage or frequency of injections

E. Discuss filler correction to deep forehead or glabellar lines.

F. Consider eyelid surgery if patient has heavy lids.
Facial Shaping With Neurotoxins

Steve Yoelin MD

I. Treatment Goals
II. FDA Approved Neurotoxins-Background
III. Anatomical Features of the Face
IV. Treatment Areas
V. Complications
VI. Managing Expectations
VII. Summary
VIII. Questions and Answers
Fillers 101: Foundations for Success

Julie Woodward MD

I. ASAPS Injectable 2015 Growth
   A. Neurotoxins: 19.9%
   B. Fillers: 26.6%
   C. Filler growth stats from major companies
      1. Allergan/Activis (Botox, Juvéderm family)
         a. Neurotoxin up 12%
         b. Filler up 11%
      2. Merz (Xeomin, Calcium hydroxylapatite, Belotero Balance)
         a. Neurotoxin: up 40% since June 2015
         b. CaHa: up 10%; hands, mid 2015; jawline and chin, soon
         c. HA filler: up 1%;—expect more pending lidocaine
      3. Suneva (Bellafill) up 30% per quarter > 1 year; 12 to 50 reps
      4. Galderma (Dysport, Restylane family) up for toxin and fillers since purchase from Valeant

II. Injection Factor Influences
   A. Needle or cannula size: A larger needle allows more filler to be injected more rapidly, but a smaller needle may be easier to cannulate into a vessel.
      1. Needles included with fillers are the only ones that are FDA approved.
      2. 30-gauge needle has outer diameter of 0.3 mm and bevel length of 0.75 mm.
   B. Depth in tissue (intradermal = more resistance, subcutaneous = less resistance)
      1. Epidermis is ≈0.3 mm
      2. Dermis is ≈0.8–1.8 mm
   C. G’: elastic modulus

III. HA Filler Characteristics, Measured In Vitro
   A. G’ (stiffness/elasticity)
   B. Viscosity (flow)
   C. Cohesivity (ability to stick to itself)
   D. Hydrophilicity (tendency to absorb water)
   E. Density (concentration of HA)
   F. Particle size
   G. Crosslinking technology affects the tissue integration: biphasic < monophasic monodensified < monophasic polydensified
   H. Advantage of HA fillers is they can be dissolved with hyaluronidase; approx. 30 U to 0.1 cc filler.

IV. Complications
   A. 98 cases of blindness reported in the literature
   B. Anatomical danger zones
      1. Infra- and supratrochlear arteries
      2. Supraorbital artery
      3. Frontal branch of the superficial temporal artery
      4. Lacrimal artery
      5. Dorsonasal artery
      6. Infraorbital artery
      7. Angular artery
      8. Zygomaticofacial artery
      9. Zygomaticotemporal artery
Table 1.

<table>
<thead>
<tr>
<th>Filler</th>
<th>Year Approved</th>
<th>Indication</th>
<th>Trial Amount / Duration</th>
<th>Phase</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restylane</td>
<td>2003</td>
<td>Mid/deep dermis</td>
<td>Up to 1.5 mL vs. Zyplast</td>
<td>Biphasic</td>
<td>WSRS, 5 point</td>
</tr>
<tr>
<td></td>
<td>2011</td>
<td>Lip over 21</td>
<td></td>
<td></td>
<td>MLFS</td>
</tr>
<tr>
<td>Sculptra</td>
<td>2004</td>
<td>Lipoatrophy</td>
<td>VEGA / Chelsea / APEX: 96 / 24 / 12 weeks; 1 vial</td>
<td>40−63 μm poly-L-actic acid</td>
<td>HAD; skin thickness</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>NL folds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Juvé Ultra/U Plus</td>
<td>2006</td>
<td>Mid/deep dermis</td>
<td>Up to 4 cc/12 mo</td>
<td>Monophasic monodensified</td>
<td>NLFSS, 5 point</td>
</tr>
<tr>
<td>Artefill, Bellafill</td>
<td>2006</td>
<td>NL folds</td>
<td>Unknown amount vs. collagen, touch-up; 12 mo</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>2014</td>
<td>Distensible acne scars</td>
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<tr>
<td>Radiesse</td>
<td>2006</td>
<td>Subdermal</td>
<td>1.2 cc, 2 touchups vs. 2.4 collagen/24 weeks</td>
<td>Ca hydroxylapatite 25−45 μm</td>
<td>LRS, 6 point</td>
</tr>
<tr>
<td></td>
<td>2015</td>
<td>Hands</td>
<td>2.6 mL per hand</td>
<td></td>
<td>MHGS, 5 point</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Merz Hand Grading Scale, 5 point</td>
</tr>
<tr>
<td>Perlane; Resty Lyft</td>
<td>2007</td>
<td>Deep and sub dermis</td>
<td>1.9−4.6 mL for bilateral</td>
<td>Biphasic</td>
<td>WSRS, 5 point</td>
</tr>
<tr>
<td>with L</td>
<td>2015</td>
<td>Preperioveal midface</td>
<td>Midface: 3 to &gt; 6 mL / 12 weeks</td>
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<td>MMVS, 4 point</td>
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<tr>
<td>Prevelle Silk</td>
<td>2008</td>
<td>Mid to deep dermis</td>
<td>–</td>
<td>Avian</td>
<td>GAIS, 7 point</td>
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<tr>
<td>J Ultra XC/UP XC</td>
<td>2010</td>
<td>Mid/deep dermis</td>
<td>14 day for safety</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belotero Balance</td>
<td>2011</td>
<td>Mid/deep dermis</td>
<td>1.5 mL / NL fold 37 weeks and 55% improved at 24 weeks</td>
<td>Monophasic monodensified</td>
<td>SRS scale</td>
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<td></td>
<td></td>
<td></td>
<td>GAIS</td>
</tr>
<tr>
<td>Restylane/ Perlane-L</td>
<td>2012</td>
<td>Mid/deep dermis</td>
<td>14 day for safety</td>
<td>Biphasic</td>
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<tr>
<td>Juvéderm Voluma XC</td>
<td>2013</td>
<td>Subcutaneous or supraperoveal injection for cheek augm over 21</td>
<td>12 mL total up to 6.6 mL per side / 67% at 24 months, 3 midface zones</td>
<td>Monophasic monodensified</td>
<td>MFVDS, 6 point</td>
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<td></td>
<td>GAIS, 5 point</td>
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<td></td>
<td></td>
<td></td>
<td>NLFS, 5 point</td>
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<td></td>
<td></td>
<td></td>
<td>Canfield 3D imaging</td>
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<tr>
<td>Restylane Silk</td>
<td>2014</td>
<td>Submucosal perioral / mid-dermis</td>
<td>2.18 mL</td>
<td>Biphasic</td>
<td>MLFS</td>
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<td>Juvéderm Volbella</td>
<td>2016</td>
<td>Submucosal</td>
<td>1 mL upper lip, 0.8 mL lower lip, 0.3 mL perioral lines, 0.5 mL commissures, 0.1 mL philtral columns</td>
<td>Monophasic monodensified</td>
<td>LFS, 5 point</td>
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<td></td>
<td></td>
<td>POLM</td>
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<td>OCSS</td>
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<td></td>
<td></td>
<td></td>
<td>GAIS</td>
</tr>
</tbody>
</table>

Abbreviations: NL indicates nasolabial; WSRS, Wrinkle Severity Rating Scale; MLFS, Medicis Lip Fullness Scale; HAD, Hospital Anxiety and Depression Scale; NLFSS, Nasolabial Fold Severity Scale; FFA, Facial Fold Assessment; LRS, Lempere Rating Scale; MMVS, Medicis Midface Volume Scale; GAIS, Global Aesthetic Improvement Scale; MFVDS, Mid Face Volume Deficit Scale; WASULL, Wrinkle Assessment for Upper Lip Lines; LFS, Lip Fullness Scale; POLM, Perioral Lines at Maximal Contraction Scale; OCSS, Oral Commissures Severity Scale.
Selected Readings


### Table 2.

<table>
<thead>
<tr>
<th>Filler</th>
<th>Crosslinking Technology</th>
<th>G’ (Pa) Measured by Rheometer</th>
<th>Viscosity η or μ (Pa·s)</th>
<th>Concentration (mg/mL)</th>
<th>Cohesivity (gm Force)</th>
<th>Hydrophilicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiesse</td>
<td></td>
<td>1407</td>
<td>349,830</td>
<td>–</td>
<td>–</td>
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<tr>
<td>Radiesse + lidocaine</td>
<td></td>
<td>1165</td>
<td>310,305</td>
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<td>–</td>
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<tr>
<td>Restylane L&lt;sup&gt;a&lt;/sup&gt;</td>
<td>NASHA BDDE (1,4-butaneol)</td>
<td>565</td>
<td>131,310</td>
<td>20</td>
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<tr>
<td>Restylane Lyft&lt;sup&gt;a&lt;/sup&gt;</td>
<td>NASHA BDDE</td>
<td>549</td>
<td>127,090</td>
<td>20</td>
<td>–</td>
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<tr>
<td>Restylane&lt;sup&gt;a&lt;/sup&gt;</td>
<td>NASHA BDDE</td>
<td>514</td>
<td>119,180</td>
<td>20</td>
<td>–</td>
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<tr>
<td>Restylane Silk&lt;sup&gt;a&lt;/sup&gt;</td>
<td>NASHA BDDE</td>
<td>344</td>
<td>20</td>
<td>–</td>
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<tr>
<td>Juvé Voluma&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Vycross (high and low MW) BDDE</td>
<td>274, 398&lt;sup&gt;b&lt;/sup&gt;</td>
<td>92,902</td>
<td>20</td>
<td>40</td>
<td>↓ H₂O absorption</td>
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<tr>
<td>Juvé Volbella&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Vycross BDDE</td>
<td>271&lt;sup&gt;b&lt;/sup&gt;</td>
<td>15</td>
<td>19</td>
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<td>Prevelle Silk&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Avian-derived divinyl sulfone</td>
<td>230</td>
<td>5.5</td>
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<tr>
<td>Belotero Balance&lt;sup&gt;a&lt;/sup&gt;</td>
<td>CPM, BDDE</td>
<td>30</td>
<td>9217</td>
<td>22.5</td>
<td>–</td>
<td>–</td>
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<tr>
<td>Juvéderm Ultra&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Hylacross BDDE</td>
<td>28, 207&lt;sup&gt;b&lt;/sup&gt;</td>
<td>7307</td>
<td>24</td>
<td>96</td>
<td>↑ H₂O absorption</td>
</tr>
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Abbreviation: CPM indicates cohesive polydensified matrix.

<sup>a</sup> An HA filler


Facial Shaping With Fillers

José R Montes MD

I. Introduction: Is volume overrated in facial rejuvenation?

Facial aging is a multidimensional and multifactorial process that reflects the dynamic and cumulative effects of time on the skin, soft tissues (fat, muscle), and deep structural components of the face (bone). Over the past 3 decades our understanding of the aging process has been enriched by means of cadaveric studies and modern neuroimaging technique. Gravitational effects, progressive bone remodeling, decrease in tissue elasticity and subcutaneous soft tissue atrophy / redistribution contribute to a process that is profoundly individualized and susceptible to intrinsic and extrinsic factors. Volume does play a major role in facial rejuvenation, and it is not overrated but it is sometimes overindicated. Volumetric filler restoration is not exclusive to the maturing face but may be the most precise maneuver for asymmetry correction in congenital or traumatic deformities.

Facial shaping with fillers or volumetric restoration requires:

- Patient assessment and selection
- Filler material selection based on rheological properties
- Safe and effective injection technique

II. Patient Assessment

Although you see with your eyes, perception and understanding of what you see is in your mind. Precision in facial shaping is about knowing and understanding anatomy with individual variations and how it changes with time.

Aging changes in bone, alterations in superficial and deep fat compartments, and differences between female and male are critical elements when discussing a treatment plan with patients.

A. Fat

1. Superficial and deep fat compartments → aging (atrophy, hypertrophy, and redistribution)
   - Atrophy: temple, cheek, periorbital, chin, mandible
   - Hypertrophy: submental region, nasolabial folds, jowls

2. Conclusion and clinical implication

   Fat compartments are deep and superficial. To correct the full-volume spectrum, a bilayer filler placement, deep (supraperiosteal) and more superficial (subcutaneous), is often indicated. For the zones of fat hypertrophy, such as submental and jowls, lipolytic agents, such as deoxycholic acid, may be considered to reduce the undesired volume.

...
Figure 1. Superficial fat compartments.

Figure 2. Deep fat compartments.

Not shown in diagram are the deep fat compartments on perioral zone and lower face.

Figure 2. Deep fat compartments.
B. Bone

There is debate about the significance of the change of facial bones for the overall aging process. Lambro’s theory of skeletal remodeling suggests a clockwise rotation of the midface relative to the cranial base. Several studies have demonstrated that craniofacial bony aging, contrary to popular belief, is one of an expansion and not of atrophy.

“Note how each of these angles has become more acute in the older male facial skeleton.” (Pessa, 2000)

1. Aging changes in bone

   Anteroposterior changes that occur with aging are related to decreased bone projection at the glabellar, orbital, maxillary, and pyriform angles.

   a. Forehead: There is no real consensus regarding upper facial bone aging. Enlow (1968) was the first to document upper facial growth and aging with protrusion of the forehead along with midfacial regression.

   b. Glabellar angle decreases

      i. Supraorbital bar and nasion recede

      ii. Brow ptosis / lateral orbital hooding

   c. Maxillary angle decreases

      i. Maxillary rotation / retrusion

      ii. Enlarged orbital aperture

         (a) periorcular soft tissue support loss (see Figure 4)

         (b) lower eyelid vertical lengthening

         (c) scleral show

         (d) malar fat pad ptosis

   iii. Bartlett has suggested a concomitant facial width and midfacial depth decline with age.

   d. Pyriform aperture increases (see Figure 5)

      i. Bone recedes.

      ii. Nose appears elongated / nasal tip dropping.

   e. Mandible

Mandibular length and height both decreased significantly for each sex. It has been observed by many that tooth retention or loss has profound influences on lower face morphology; “With tooth loss there is decreased vertical and anteroposterior dimensions of both maxilla and mandible” (Bartlett, 1992).


Figure 4. Example: Negative vector patient.

2. Conclusion and clinical implication
   
a. Bony framework changes have a significant impact on soft tissue, especially at the midfacial zone. This manifests in the aging patient as lower eyelid support loss, canthal rounding, and scleral show; on the extreme side of the spectrum is the so-called “negative vector patient” (see Figure 4). Despite controversy on forehead bone resorption or “protrusion,” soft tissues and fat atrophy are well documented at the forehead unit in some individuals, making them good candidates for volume replacement (deep injections, small aliquots). The goal to midforehead volumization is to smooth natural frontal convexity, with the added benefit of improving resting and dynamic lines upon frontalis muscle recruitment. Pyriform aperture enlargement can be improved with filler injections, taking extreme precautions to avoid angular artery cannulation.

b. Patient assessment summary: Learning to identify the sometimes-subtle changes at the deep and superficial fat compartments with aging is critical for precise injection placement (deep vs. subcutaneous) and for achieving harmonious volume restoration respecting the natural concavities of individual patients. Not every shadow or concavity needs to be filled. Looking at old pictures helps to tailor treatment to specific patient’s features and is a great tool for educating patients about their specific involutional changes. (See Video 1, Safety Injection Technique.)

III. Filler Material Selection

After 3-D patient assessment, which must include palpation, a complete oculofacial exam, gathering information with respect previous cosmetic surgeries or treatments, and old pictures examination, we should have a good idea of the status of bony framework, skin, and soft tissue alterations.

A. For patients with panfacial volume loss (more than one large facial zone—eg, midface and temporal) or patients with facial frame loss, superficial temporal preauricular fat pads atrophy, I prefer to use a biostimulant agent such as Poly-L-lactic acid (PLLA-Sculptra), total dilution per vial of 9 cc, in a treatment sequence of 2 sessions every 4 to 6 weeks (see Figures 8 and 9). After volume correction is achieved, I proceed with shaping or sculpting the “light reflection” zones such as the cheek apex with a high viscosity or high G’ products (hyaluronic acids or CaHa).

B. For isolated midface / cheek volume and contour definition, a high G’ product or high-viscosity product with lifting capabilities such as CaHa (Radiesse), Voluma, or Restylane Lyft is preferred. See Figure 10.

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Note: Overfilling temporal fossa makes the patient look less feminine.

Figure 7. Pitfalls of overfilling: Temporal fossa. Slight concavity on temporal fossa may be a desired feature on a woman; in men, flatness or mild convexity is more accepted.

Figure 6. Pitfalls of overfilling: Lower eyelid overfilling. Instead of making a smooth transition of eyelid and cheek, transition is completely erased.

Note: Areas of overfilling with HA (arrows) requiring dissolution with hyaluronidase.
Figure 8. Sculptra peanut face patient: 45-year-old patient, 4.5 cc on each side (9-cc dilution vial), 1 vial per session. Second session 3 months after, and third session a year after the first session. From left to right: (1) amount injected per zone, (2) injection depth supraperiosteal (SP) and subcutaneous (SC), (3) before treatment, (4) 1 year after first injection session.

Figure 9. Lasting effect over 2 years: 50-year-old patient, Sculptra results after 3 sessions with 2 vials per session, each vial 9-cc total volume (7 cc sterile water with 2 cc lidocaine 1% with epinephrine) and 6 weeks treatment intervals. Left: 2011. Center: Marks, SP = supraperiosteal; SC = subcutaneous. Right: 2014.

Figure 10. Voluma XC injection: 1.0 cc on each midface at zygomaticomalar, submalar, and anteromalar regions, same amount at each zone, 29-gauge needle, deep supraperiosteal injections, pillar technique.
C. Periocular reshaping is better achieved with hyaluronic acid because it can be reverted with hyaluronidase injection. Due to cohesive polydensified matrix (CPM) technology, more cohesive products, such as Belotero Balance (Merz Pharmaceuticals), can be injected below the thin periocular skin and presents with less incidence of swelling or Tyndall effect than other more granular, less cohesive hyaluronic acids. For isolated tear trough correction in the young patient with good skin texture, I prefer to use Restylane, injected at the supraperiosteal level for a lasting effect from 1 to 3 years. For periocular treatments, I favor cannula injection for safety and to decrease chances of bruising. Products with low concentration of hyaluronic acid, such as Volbella (non-FDA approved), may be the ideal products for the periocular area since they present with less swelling. Voluma (Allergan Inc.), which has an FDA indication for midface volumization, has a lower hyaluronic acid concentration (20 mg/mL) than other hyaluronans despite its lifting capability. I have injected several patients with Voluma at tear trough deformity with good results. (See Videos 2-4, Tear Trough Cannula Injection, Upper Eyelid Cannula Injection, and Tear Trough Combination with Midface Injection.)

D. Forehead shaping

Material of choice: hyaluronic acid injected deep over periosteum in small aliquots followed by massage. (See Figure 12 and Video 5, Forehead Injection.)

E. Lower face, perioral, lips, chin, jaw line

1. For perioral and lips, “soft” hyaluronic acid products, less granular and more cohesive, such as Restylane Silk, are preferred for perioral, radial “barcode” lines. For actual lips volume augmentation, a product such as Juvederm Ultra (Allergan Inc.) may be more efficient and longer lasting at the expense of more expected swelling. (See Video 6: Lip Definition with Restylane Silk.)

2. For chin and jaw line shaping, the menu of possibilities includes almost everything: from biostimulant agents, such as poly-l-lactic acid and CaHa (Radiesse) to the strong (high G’) hyaluronic acids. My approach for jawline definition consists on dual deep injection: depot supraperiosteal injection at jawline deep indentations with a high G’ filler (such as CaHa) and subdermal lineal retrograde injection with high viscosity filler agents (Vycross HA-Voluma). Combination of the filler injections with the lipolytic effect of Kybella (on label for submental fat reduction, off label for jowl reduction) in selected cases may synergistically work to achieve a more defined jawline. Neurotoxin injection is usually performed along the DAO (depressor anguli oris mm) and platysma vertical bands and platysmal jaw insertions to further potentiate the desired smooth contour. (See Video 7, Jawline Shaping.)
IV. Safe and Effective Injection Technique

Ensuring safety on injection is about understanding anatomy and good aspiration and injection technique.

A. Anatomy

1. Facial foramina with vascular bundles can be precisely located using patient’s pupil as a GPS for safety (e.g., supraorbital foramina is aligned with the medial iris limbus of your patient and the infraorbital vessel is aligned between the pupil and medial iris limbus and exactly 8-10 mm below the infraorbital rim).\textsuperscript{12,13} See Figure 13.

2. Avoid danger zones (glabella, nose, pyriform area, temporal fossa), unless you are an experienced injector. For example, injecting the nasolabial fold at the canine fossa may require an agent capable of “bonafide aspiration” if you are injecting deep, since there is a potential for angular vessel cannulation. For this area, I usually inject poly-l-lactic acid because aspiration is possible. In addition to aspiration, I change my needle direction away from danger zone: instead of directing injection toward lateral nose, I fill the canine fossa directing my needle toward upper lip. See Figure 14.

B. Aspiration: Be aware that aspiration maneuver with most of the injectable and supplied needles is false.\textsuperscript{14} True aspiration sometimes requires a bigger caliber needle and time to withdraw on syringe plunger.

C. Inject slowly: Use small caliber needles and syringes; keep moving while injecting.

D. Vasoconstrictor agents

E. Cannula when possible, especially for periocular injections
F. Conclusion and Pearls

1. Give special attention to deflation by looking at the patient on frontal, oblique, and lateral views. See Figure 15.

2. Tilt the head slightly inferiorly to assess the effect of gravitational pull. See Figure 16.

3. The small “peanut” face patient who lacks facial frame may benefit from superficial temporal fat compartment injection, prior to central face injections (see Figure 8).

4. The patient with “weak” maxillo-malar projection usually presents with abrupt demarcation lines between the inferior orbit and midface. For this subset of patients, revolumization must begin on the midface. Palpate inferior orbital rim during assessment and palpate inferior orbital rim while injecting at 2 depths: deep and subcutaneous.

5. Periorbital filler injection requires vast experience in this zone anatomy. Choice of material should be limited to “reversible” agents such as hyaluronic acid. Cannula injection is advocated for safety and to decrease bruising incidence.

6. Lower face reshaping should include assessment of lip, perioral zone, chin, jawline, submental area, and neck. Recently approved product for submental fat reduction, deoxycholic acid (Kybella; Allergan), has ignited a recent interest in nonsurgical jawline reshaping, with a growing trend among men requesting lower face treatments.

7. Forehead volume replacement must take into consideration brow position, fronto-orbital anterior projection, and assessment of brow/forehead skin mobility or anterior lamella forehead ptosis. The purpose of forehead volume restoration should be to recreate frontal convexity and give support to eyebrow complex.

References


Complications of Fillers

_Catherine J Hwang MD_

I. Overview of Fillers for Cosmetic Use

II. Categories of Complications
   A. Nonischemic
   B. Ischemic
      1. Skin ischemia / necrosis
      2. Blindness

III. Management of Complications of Fillers
   A. Importance of hyaluronidase
   B. Potential treatments and research
Case Presentation: Filler Patient Evaluation and Treatment

Wendy W Lee MD

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Case Presentation: Filler Complication

Wendy W Lee MD

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Intraoperative Navigation for Orbital Surgery: Indications and Technique

Grant D Gilliland MD and John N Harrington MD

I. What Is Intraoperative Navigation?
II. Evolution of Intraoperative Navigation Technology
III. Indications for the Use of Intraoperative Navigation in Orbital Surgery
   A. Thyroid orbitopathy
   B. Orbital trauma
   C. Orbital foreign bodies
   D. Congenital anomalies
   E. Multispecialty operations
IV. Downside of Intraoperative Navigation
V. The Future of Intraoperative Navigation in Orbital Surgery
Orbital Decompression: Expanding Indications

Raymond S Douglas MD PhD
Endoscopic Approach to Orbital Surgery

Suzanne K Freitag MD

Introduction

Orbital surgery poses a unique set of hurdles, including the presence of an important sensory organ in a small bony space surrounded by fat, which can be difficult to manipulate, as well as numerous tiny nerves and vessels, all serving a critical role in perfusing the globe and orbital structures and preventing diplopia. When pathology occurs in the orbit, the anatomic location of the surgical target and its relationship to the optic nerve often dictate the surgical approach. Pathology of the orbital apex has traditionally been difficult to manage, with transcranial surgery often the safest option. With the advancement of endonasal endoscopic surgical instruments and techniques, many more orbital procedures can safely be performed using this minimally invasive approach, combining the multidisciplinary skills of an experienced orbit surgeon and an otolaryngologist.

Technique

We use a 4-handed endonasal endoscopic technique to approach a variety of pathologies and indications in the posteromedial orbit and orbital apex, including excision of orbital mass, foreign body removal, optic canal decompression or biopsy of mass. A stereotactic image guidance system is used intraoperatively to maximize safety. Surgery is begun with a standard maxillary antrostomy, ethmoidectomy, and sphenoidotomy. A large posterior septectomy is created to allow passage of instruments through both nostrils. A contralateral nasoseptal mucosal flap is harvested at this point to allow for reconstruction of the medial wall of the orbit at the end of the procedure. The lamina papyracea is opened, and the periorbita is incised to allow access to the orbit. At this point, the endoscope is driven by the assistant surgeon via the contralateral naris, while the primary surgeon places a retractor in the contralateral naris for medial rectus muscle retraction and a dissecting instrument in the ipsilateral naris for surgical manipulation within the orbit. The assistant surgeon may then, as needed, place suction or another instrument via the ipsilateral naris. Careful handling of the medial rectus muscle and careful navigation through the orbital fat allow for identification of the surgical target. Once the lesion or foreign body has been removed or biopsied, the periorbita is replaced over the medial wall defect. If the orbital wall defect is large, as in cases of removal of a large tumor, it is important to consider reconstruction to prevent postoperative enophthalmos. This can most easily be accomplished by placing the previously harvested nasoseptal mucosal flap over the defect followed by a splint or packing. The nasoseptal flap is harvested to retain its blood supply from the sphenopalatine artery and is stored in the nasopharynx during the earlier portions of the surgery.

Summary

This technique has been useful in my practice for a wide variety of indications and has been very successful. We have been able to locate all targeted lesions and remove those for which excision was intended. This technique provides the most direct route of access to the posteromedial orbit and orbital apex, and it is useful for both intraconal and extraconal lesions. The illumination and visualization are very good. This procedure avoids the risk of collateral damage to structures that would have been traversed using other surgical approaches, such as brain and globe. This 2-surgeon, 4-handed technique allows the primary surgeon to use both hands for the delicate orbital apex dissection. There have been no cases of postoperative diplopia and no cases of postoperative enophthalmos greater than 1 mm.

Selected Readings


Management of Orbital Invasion of Skin Cancers

Basal Cell Carcinoma

Basal cell carcinoma (BCC) is the most common malignant periocular tumor, accounting for 90% of eyelid malignancies. Orbital invasion by periorbital BCC is uncommon, with reported incidences of 0.8%-5.5%. BCC is the most frequent cause leading to orbital exenteration.¹

Risk factors of orbital invasion include the following:²,³

- Male gender
- Multiple recurrences
- Large lesion size
- Aggressive histologic subtype
- Perineural invasion
- Medial canthal location
- Advanced patient age

The most commonly encountered BCC histological subtypes are the less aggressive nodular and superficial types, with the more aggressive subtypes such as infiltrative, morpheaform / sclerosing, and basosquamous accounting for only 5%-7% of all cutaneous BCC. However, in cases of BCC with orbital invasion, the more aggressive subtypes make up more than 80% of cases, with infiltrative being the most commonly reported subtype encountered (51.6%-78.6%).³,⁴

Signs and symptoms of orbital invasion:

- Visible or palpable mass
- Mass fixed to orbital bone
- Limited ocular motility
- Globe displacement

Management of periocular BCC with orbital invasion is challenging and often requires a multidisciplinary approach incorporating ophthalmology, oculoplastics, radiation oncology, craniofacial surgery, otolaryngology, dermatology, and with the advent of targeted therapy, opinions from medical oncology.

Exenteration with or without radiotherapy is the treatment of choice for patients with bulbar or extensive orbital invasion.³,⁵,⁶,⁷ Exenteration may be complete or partial and may require extended craniofacial approaches depending on the extension of the disease. Complications including fistula formation and CSF leak may occur in up to 25% of cases and may require additional surgery.⁵,⁹

Globe-sparing local excision with or without radiotherapy and close follow-up with regular imaging is an alternative option.⁵

Indications for globe sparing surgery include the following:

- Anterior orbital involvement only
- Full extraocular movements
- Patients with a single eye
- Patients who decline exenteration

Margin control should be strongly considered for cases treated with local excision. Mohs micrographic surgery is usually not appropriate in the setting of deep orbital invasion because of the difficulty of obtaining correctly orientated specimens in orbital soft tissues.¹⁰ Additionally, there is a significant risk of false-negative results with standard frozen section techniques.⁴ Therefore the use of paraffin section remains the margin control of choice for BCC with orbital invasion, as it provides high-quality tissue morphology, including cases involving orbital fat.

Aberrant activation of the hedgehog signaling pathway is a key driver in the pathogenesis of BCC, and vismodegib is the first hedgehog pathway inhibitor approved for the treatment of advanced, inoperable BCC.¹¹ 150-mg vismodegib once a day showed clinical benefit in patients with locally advanced or metastatic BCC who were not eligible for surgery, with 43% of patients achieving an objective response in locally advanced BCC and 30% in metastatic BCC.

Adverse effects are very common. Up to 98% of patients had at least 1 adverse event, the most common being the following:¹²

- Muscle spasms: 64%
- Alopecia: 62%
- Dysgeusia: 54%
- Weight loss: 33%

Other targeted therapeutic agents currently being studied are LDE225 and IPI926.

References
Pediatric Orbital Tumors: Update on Diagnosis and Management

Timothy John Sullivan MBBS

Pediatric orbital tumors offer not only diagnostic challenges but also hurdles with regard to investigation, pathology, and management, which is often multidisciplinary. A child with an orbital tumor might be asymptomatic but could also present with inflammatory or hemorrhagic features or acute pain. History may be scant, especially in preverbal children. The ophthalmologist needs to have an awareness of the broad range of benign and malignant conditions that can affect the pediatric orbit. Close liaison with other specialties is important, as some conditions might be predicted prior to conception by family history and genetic testing and even diagnosed antenatally in utero with ultrasound and other techniques. Presentation can be varied. Generally slow growing, painless lesions are benign, whereas rapidly growing lesions raise the possibility of an inflammatory or malignant process and may or may not be painful.

The most important role the ophthalmologist has in assessing these children is to be aware of the possibility of malignancy and to either make or exclude the diagnosis. Should malignancy be confirmed, urgent multidisciplinary oncology management should be instituted.

Since the sequencing of the human genome was published in 2001 we have developed an understanding of the genetic basis and molecular diagnosis of many orbital tumors. Springboarding from this, advances in molecular genetics, proteomics, metabolomics, nanotechnology and analysis with bioinformatics are leading toward targeted patient-directed therapy for many tumors.

Underpinning this is an increasing knowledge of the mechanisms involved in tumor initiation, progression, and spread. Various of these tumor pathways, including MAPK, WNT, P13K-AKT, and hedgehog, are now providing targets for specific treatment in specific tumors.

Congenital dermoids are choristomas that may not become apparent until some time after birth. Usually superolateral, dermoids do not require imaging if freely mobile and can be removed electively. Fixed or atypical cystic lesions warrant imaging to define any intraorbital or other extension to plan safe removal. Dermatolipomas are unrelated choristomas and can be managed conservatively if asymptomatic. When they cause irritation because of surface hairs or keratin, or are unsightly, removal of the component anterior to lacrimal gland ductules is acceptable.

Visual pathway gliomas usually have a slow-growing course, but it is now known that neurofibromin regulates RAS and cAMP signalling and if the NF1 gene is inactivated, tumor growth can occur. Most lesions are managed conservatively, but worsening visual acuity or unsightly proptosis may warrant targeted therapy or surgical debulking via a lateral or transcranial route.

Propranolol has revolutionized the management of periorcular infantile hemangiomas, but there may still be some lesions that need other modalities, including surgery for residual lesions following propranolol or in the situation where a lesion is amelioric but not responding to the propranolol.

Lymphangiomas should be classified according to the International Society for the Study of Vascular Anomalies schema and will be discussed elsewhere in today’s Subspecialty Day syllabus.

Langerhan cell histiocytosis is now known to be derived from myeloid dendritic cell precursors, not cutaneous dendritic cells, and is a myeloid neoplasia, with mutations leading to mitogen-activated protein kinase signalling pathway. Systemic imaging and assessment are important to define the extent of disease. Where it is limited to a solitary lesion of the orbit (eosinophilic granuloma) local extirpation and steroids may be sufficient. Disseminated disease will require pediatric oncological management, possibly using chemotherapy, BRAF inhibitors, or prostaglandins.

Rhabdomyosarcoma presents with proptosis, globe displacement, ecchymosis, or inflammation—signs common to many orbital diseases. To prevent delays in diagnosis the clinician must consider rhabdomyosarcoma in any child with these features. Early imaging and diagnostic biopsy should be obtained. Morphology and molecular genetics can distinguish between the embryonal and alveolar subtypes seen in the orbit, followed by oncological management with chemotherapy and radiotherapy and now the opportunity for targeted therapy. Prognosis has improved considerably, although lesions that invade the orbit secondarily have a poorer prognosis.

Although adenoidcystic carcinoma of the lacrimal gland is more commonly an adult disease, it certainly can occur in children. The signature genetic defect is a balanced translocation resulting in the MYB-NFIB fusion gene. Traditionally associated with a poor prognosis, with dacryoadenectomy or cranio-orbital resection, chemotherapy, and radiotherapy this might improve with targeted therapies, including sorafenib or bortezemib.

Lymphoproliferative disorders are generally manifestations of leukemia, although true orbital lymphoma does occur in children. Treatment is systemic and being moved forward by targeted therapy.

### Benign Orbital Lesions

- Dermoid
- Dermatolipoma (not cystic)
- Microphthalmos with cyst
- Encephalocele
- Teratoma

### Neurogenic Lesions

- Visual pathway glioma (with or without neurofibromatosis 1)
- Meningioma

### Peripheral Nerve Sheath Tumor

- Vascular
  - Infantile hemangioma
  - Lymphangioma / venous lymphatic malformations (discussed elsewhere)
- Histiocytic
  - Juvenile xanthogranuloma
  - Langerhan cell histiocytosis
  - Erdheim Chester disease
- Bone
  - Fibrous dysplasia
  - Aneurysmal bone cyst
  - Osteoma
  - Juvenile ossifying fibroma

Malignant Lesions
- Rhabdomyosarcoma and other sarcomas
  - Alveolar soft part sarcoma
  - Infantile fibrosarcoma
  - Ewing sarcoma
  - Primitive neuroectodermal tumor
  - Osteosarcoma

Lymphoproliferative
- Granulocytic sarcoma
- Lymphoma
- Lacrimal gland adenoid cystic carcinoma
- Malignant teratoma
- Metastasis
- Neuroblastoma
- Secondary retinoblastoma

Selected Readings
Management of Orbital Lymphangiomas

Kenneth Cahill MD FACS, James Murakami MD, William Shiels DO (1954 to 2015), Jill Foster MD, Cameron Nabavi MD, Daniel Straka MD

This paper is presented regarding an institutional review board–approved study of intraliesional treatment of venolymphatic malformations at Nationwide Children’s Hospital in Columbus, Ohio.

The diagnosis of venolymphatic malformations is usually based upon clinical and radiological characteristics. Histopathology is only infrequently obtained. Affected patients usually have the onset of symptoms before the age of 20 years. There is typically an acute expansion(s). In this presentation, we are particularly interested with the periocular involvement of eyelids, conjunctiva, orbit, and face. CNS and other body parts can also be affected. Radiologically, there are typically thin-walled fluid-filled cysts ranging from micro (4 mm) to macro (> 1 cm) in size. They can be solitary or numerous. Frequently, they will exhibit layers associated with blood degradation products. Thick fibrotic tissue can occur, especially with chronic lesions.

The treatment can consist of observation or emergent aspiration when vision and/or the cornea are at risk. Intraliesional sclerotherapy has been shown to be effective. Some systemic medications show promise and are being actively studied.

For sclerotherapy, there is no single agent or single treatment protocol that works for all lesions. Bleomycin in concentrations of 1-2 mg/mL is the most frequently used sclerosing agent. It seems to cause the least amount of swelling and inflammation of the agents that we use. When used in relatively low doses, its risks of pulmonary fibrosis and skin hyperpigmentation are diminished. It is used as a foam prepared with 25% human serum albumin (HAS) and administered with real-time ultrasound. Direct observation is used for the conjunctival lesions. This is not used for macrocysts.

Doxycycline can be used in concentrations of 10 mg/mL mixed with 25% human serum albumin. More concentrated doses are not used because of their increased tissue inflammation. Despite this, doxycycline still causes more inflammation and swelling than bleomycin. For this reason, it is typically not chosen for deeper orbital lesions or subconjunctival cysts. It is primarily used for small to medium-sized cysts in the eyelids, especially if bleomycin has not been effective. Doxycycline has been shown to disrupt the VEGF pathway cysts, and an apparent decrease in the risk of recurrent “rebleeds.” We are now reviewing our first 80 treated patients, who all have follow-up over 1 year, up to 13 years.

Systemic treatment with sildenafil and sirolimus are being studied as systemic or as medical treatments. Both of these medications do have side effects and need to be monitored. Their beneficial effect may be partially lost upon discontinuation. Hopefully, treatment trials of these medications will result in more treatment options, either as independent agents or as adjunct to sclerotherapy. Hopefully, these trials will also enable us to learn more about the nature of lymphangiomas so that future treatments can more specifically control their specific properties.

Selected Readings


Evisceration: Pearls for Success

Don Liu MD

I. Indications for Enucleation and Evisceration
A. Evisceration may be done under IV sedation and retrobulbar anesthesia.
B. In addition to good surgical technique, success is ensured by proper patient selection, obtaining informed consent, giving patient emotional support, and working closely with an ocularist.
C. Patient may be emotionally devastated and need psychiatry consult.

II. One-Eyed Patient Limitations

III. Primary Implant Technique and Other Techniques
A. Implant choices
B. Step-by-step surgical technique with key points highlighted
C. Choice of anesthesia; retrobulbar injection
D. Use antibiotic eye drop throughout the procedure. Judicious antibiotics when indicated.
E. Peritomy. Minimize tissue manipulation and preserve conjunctiva. Watch out for increased IOP when entering AC.
F. Remove cornea. Culture and sensitivity studies when indicated.
G. Use proper instruments, including Adson forceps.
H. Remove intraocular contents. Scrub sclera with alcohol followed by irrigation and suction. Maintain good hemostasis.
I. Remove dirty instruments; use fresh sterile instruments. Redrape and reglove.
J. Posterior sclerotomies in 4 safe quadrants. To avoid injury to other tissues, pull sclera toward the blade and slice sclera with 2-3 mm of the tip of the blade toward the optic nerve head.
K. Anterior relaxation incisions at 3 and 9 o’clock. Sizer to help select proper implant.
L. Snug fit. Do not trim sclera; ok to overlap. No tension at edges.
M. Layered closure: interrupted 5-0 Vicryl for sclera and subconjunctiva, 6-0 running gut for conjunctiva.
N. Insert conformer with antibiotic ointment. Apply tincture of benzoin and pressure dressing with fluffy and elastic tape.
O. Leave pressure dressing undisturbed for 5 days. Pain killer when indicated. First postop exam 5 days later.

Selected Reading
Enucleation: Pearls for Success
10 Pearls to Consider

D R Jordan MD

I. Indications
A. Globe harboring a malignancy, not amenable to alternative treatment (eg, proton beam irradiation or episcleral plaque brachytherapy)
B. Blind painful eye with little if any information about past history
C. Otherwise, I prefer evisceration (quicker, less disruption to anatomy, better motility)
D. What about sympathetic ophthalmia (SO)?
   1. Historically enucleation considered within 10-14 days for severely traumatized eyes
   2. I have not this done in over 25 years!
      a. SO is very rare (0.2%-0.5% open globe injuries, ie, 2-5 per 1000).
      b. SO can still occur post enucleation.
      c. 9999 enucleations required to prevent 1 case of SO!
      d. Improved medical therapy in 2016 (steroids / immunosuppressives)
   3. Keeping the eye: avoids facial disfigurement (psychological trauma), improved self-image, and self-esteem to have all body parts
   4. A phthisical eye – great platform for artificial eye

II. Verification
A. You, not the resident, need to verify the eye.
B. I ask patient to touch the eye, and I mark the eye out.
C. Verify consent

III. Instrumentation
Be sure to have:
A. Bright headlight
B. Malleable ribbon retractors
C. Bayonet bipolar cauter
D. Neurosurgical cottonoid sponges (1 inch x ½ inch)

IV. Anesthesia
A. My preferred Rx: IV monitored care, walk in / walk-out
B. General anesthesia for kids / teens / < 50 years
C. Postop pain: tramadol / hydrocodone / morphine, ± Gravol PO or suppository

V. Extraocular Muscles
A. Do you tag them with sutures or just cut and release?
B. I like to simply use a muscle hook to localize, then cut them away!
C. They do not slip into the orbit!
D. Held in place by connective tissue framework
E. Fast, no risk of globe penetration by resident

VI. The Implant: Porous vs. Nonporous
A. Does not matter
B. With porous, no motility advantage unless you peg (< 1%)
C. Infection / migration / extrusion: low for all, if technique meticulous

VII. Implant Volume
A. Bigger is better.
B. Enucleation and secondary implants (adults): 20 mm, 21 mm, 22 mm
C. Evisceration (adults): 20 mm, 21 mm

VIII. Implant Wrap and Scleral Cap
A. Vicryl mesh or scleral wrap around porous implant
   1. Facilitates entry into orbit, added protection
   2. Easy to attach extraocular muscles to wrap
B. Scleral cap: added barrier, easy to attach to Vicryl mesh
C. No reactions to Vicryl mesh in over 800 wrapped implants

IX. Closure
A. 2 layer (4, 5, 6-0 Vicryl, 6-0 plain suture)
B. Conformer in everyone
C. Frost suture: 6-0 plain upper lid to lower lid; always used
   1. Maintains fornices
   2. Prevents chemosis

X. Prosthetic Maintenance and Care
A. All need to be followed by ophthalmologist and ocularist. Small problems are easily handled before they become major problems.
B. Ocularists to polish and adjust fit at least yearly: Essential
C. For patient: “hands off.” The less they touch the prosthetic eye, the better.
D. If they remove, rinse with cool tap water only.
E. All need lubrication: moisture drops, gels

XI. Summary
A. Eye contact is the focal point of interpersonal communication.
B. Providing a natural-appearing prosthetic eye is important.
The vast majority of orbital imaging relies on 2 readily available techniques: magnetic resonance imaging (MRI) and computed tomography (CT). Both modalities provide excellent resolution of the orbit / skull base and allow for vascular imaging when needed. As with all technology, each has its advantages and disadvantages. This update will concentrate on 2 specific imaging techniques: diffusion-weighted imaging in MRI and positron emission tomography.

**Diffusion-Weighted Imaging**

One of the readily available techniques in MRI is diffusion-weighted imaging (DWI), which is used by our radiology colleagues routinely to help narrow the differential diagnosis of pathology throughout the body. Unfortunately, DWI is also routinely ignored by the oculoplastics / orbital specialist during MRI interpretation, mainly because it is poorly understood.

DWI is most easily considered an MRI technique that measures Brownian motion of water in tissue. To oversimplify, any pathologic process made up of tightly packed cells with a high nuclear to cytoplasmic ratio will restrict the movement of free water, giving off a signal that is interpreted as “restricted diffusion” by the radiologist. Conversely, a paucicellular process will allow free Brownian movement and appear as a different signal on DWI. One can therefore distinguish a very cellular process (eg, lymphoma) from something with less cellular congestion (eg, idiopathic orbital inflammatory syndrome).

The apparent diffusion coefficient (ADC or ADC map) is essentially the converse of DWI: an entity that is bright on DWI will be dark on ADC. The nonradiologist, including this author, often has difficulty remembering DWI patterns. The key to orbital DWI/ADC is the vitreous, which is basically free water and shows no restriction to diffusion. If an orbital process has a markedly different signal intensity than vitreous on DWI/ADC, then one can conclude that it “restricts diffusion” and is therefore a highly cellular process. If the signal mimics that of vitreous, the pathology is likely paucicellular. One of the major difficulties with DWI/ADC of the orbit is that, at present, only axial images are available and these are highly pixelated affairs. Unless the orbital process is of significant size, accurate DWI interpretation is difficult.

An “ADC coefficient” provides a somewhat objective value to the amount of restricted diffusion, and this has been used by researchers in an attempt to find the elusive “ADC threshold” that might help to distinguish between inflammatory and non-inflammatory processes, as well as between benign and malignant processes. The results of these studies, along with their limitations, will be discussed in detail.

**Positron Emission Tomography**

As an oversimplification, CT and MRI for the most part provide anatomic imaging of the body. Positron emission tomography (PET) provides metabolic imaging, which is extremely helpful in the diagnosis and management of a variety of disease processes, most importantly malignancy. Briefly, radioactively tagged glucose (18fluorodeoxyglucose, FDG) is injected into the body, where it is absorbed by normal cellular activity but not metabolized; very metabolically active tissue (eg, malignant cells) will preferentially absorb and “store” the FDG. As the FDG undergoes radioactive decay, an anti-electron (positron) is emitted, finds an electron, and the pair mutually annihilate, producing 2 photons of very specific energy that are then measured by the detector. High metabolically tissue will emit more positrons than indolent tissue, and this will show up as a hot spot on the final image. Moreover, this increased signal can be assigned a specific number, known as a “standard uptake value” (SUV), that provides the radiologist with a clue as to the nature of the process (inflammatory, malignant, etc.). PET images are speckled, Seurat-like views of the body and are not very accurate anatomically. Because of this, essentially all PET performed in a nonresearch setting is coupled with a low-resolution CT to provide both metabolic and anatomic information—hence, the vast majority of PET is routinely performed as a PET/CT study.

PET/CT is very helpful in the diagnosis and staging of malignancy but has several drawbacks in the orbit. First, a significant amount of orbital pathology falls below the minimum resolution of PET/CT. Second, the brain has a very high background PET signal (as does the heart), and this may make it difficult to distinguish orbital pathology from the CNS, especially for orbital apical processes. Finally, one of the most common uses of PET/CT in orbital disease is for the management of B-cell lymphoma. About 75%-80% of ocular adnexal lymphoma is an indolent subtype, with low metabolically activity that may not distinguish itself on PET/CT. Staging for ocular adnexal lymphoma may be the most important use of PET/CT for orbital specialists, and the results of recent studies will be discussed.

**Selected Readings**


Pediatric Orbital Trauma

Louise A Mawn MD
Complex Craniofacial Trauma: An Oculofacial Plastic Surgeon’s Perspective
Orbit Fracture Repair: What We Contribute

H B Harold Lee MD FACS

I. Facial Anatomy
II. Le Fort Fracture Pattern
III. Manson Types of Naso-orbitoethmoid (NOE)
IV. Use Orbitocentric Approach
   Start inside out.
V. Le Fort II Fracture Pattern
VI. “Outside-In” Reduction
   A. No true need to access internal pyramid
   B. No medial incisions
   C. More difficult to align medial landmarks once outer fixation is performed
VII. Midface “Shatter”
   Secure midface “central” anatomy and then work out.
VIII. In Contrast ...
   Le Fort I and Le Fort III are more amenable to outside-in techniques.
IX. How do we get there?
   A. External medial orbitotomy incisions: access to nasal anatomy
      1. Nasofrontal suture line
      2. Nasal dorsum
      3. Medial wall
   B. Traditional transconjunctival incisions
   C. Intraoral incisions approaching the midface and medial buttress
X. Medial Orbitotomy Incisions
XI. Transcutaneous Medial Canthal Tendon Approach
   A. Blade kept in frontal plane
   B. Bilateral incisions / continuous dissection
   C. Microfixation plates (1.0-mm low-profile)
   D. Intraoperative repair
XII. Post–Face Trauma Syndrome
   A. Wide zygomas, flat cheek
   B. Short face
XIII. Primary Orbitocentric Approach
   A. Primary repair, after
   B. Primary repair, before trauma
XIV. Conclusions
   A. Complex fracture open reduction and internal fixation (ORIF) “Do”s
      1. Exposure of central facial anatomy
      2. Open reductions with “inside-out technique”
   B. Avoid
      1. “Outside-in” repair
      2. Closed reductions
Controversies in the Management of Orbital Blowout Fractures

Michael A Burnstine MD

I. Management of orbital blowout fractures is controversial.

II. Sequelae After Orbital Fractures
   A. Optic neuropathy
   B. Diplopia from extraocular muscle dysfunction
   C. Enophthalmos
   D. Infraorbital nerve anesthesia or hypesthesia

III. Clinical Indications for Repair
   A. Immediate
   B. Repair within 2 weeks
   C. Observation

IV. Areas of Controversy

V. Case Studies
Traumatic Ptosis: Treatment Recommendations

Bobby S Korn MD PhD FACS

I. Etiology
   A. Direct muscle injury
   B. Aponeurotic disinsertion
   C. Neurogenic

II. Diagnosis / Workup
   A. Levator excursion / frontalis function
   B. Eyelid crease, MRD1, lagophthalmos
   C. Other associated cranial neuropathies

III. Management
   A. Observation
   B. Levator surgery: external vs. internal
   C. Frontalis sling: silicone rod, fascia lata, frontalis muscle flap

IV. Complications
   A. Overcorrection / undercorrection
   B. Contour irregularities
   C. Lagophthalmos
   D. Ectropion / entropion
   E. Corneal abrasion / ulceration / perforation
   F. Hemorrhage / hematoma
Modern-day Management of Canalicu lar Lacerations

M Reza Vagefi MD

I. Anatomy of the Lacrimal Drainage Apparatus
II. Mechanisms of Injury
   A. Indirect: blunt trauma
   B. Direct: penetrating trauma
III. Epidemiology
IV. Patient Evaluation
V. Surgical Repair
   A. Setting
   B. Anesthesia
   C. Lacrimal stents
   D. Goals and techniques
VI. Controversies
   A. Timing of repair
   B. Necessity of repair of single-lacerated canaliculus
   C. The pigtail probe
   D. Closure of laceration
   E. Monocanicular vs. bicanalicular stenting
   F. Stent removal
VII. Results
VIII. Complications

Selected Readings


Lower Lid Retraction: Choosing the Right Implant

Eric A Steele MD

Lower lid retraction following trauma can be difficult to correct. This can occur due to bony midface deformity, damage to the facial nerves or musculature with midface descent, or from scarring of the anterior, middle, and/or posterior lamellae of the lower lid. Medical management, including the use of lubrication and moisture chambers, can provide temporary relief until definitive surgical management can be undertaken. Additional compensatory treatments to protect the eye have included temporary and permanent tarsorrhaphies and hyaluronic acid fillers. Midface lifting and full-thickness skin grafts can augment the anterior lamella vertically, and release of the lower lid retractors has been used to elevate the lower lid margin. But for definitive management of cicatricial lower lid retraction, a posterior lamella spacer graft is required.

There has been a multitude of spacer grafts reported for augmentation of the middle and posterior lamellae. Donor sclera, temporalis fascia, and auricular and septal cartilage have been well described in the literature. Polytetrafluoroethylene, porous polyethylene, dermal collagen, and autogenous and irradiated tarsus have also been used with some success.

Hard palate mucosal grafting has been perhaps the most commonly used spacer graft in the setting of cicatricial lower lid retraction. Considered by some as the gold standard, it is rigid enough to provide sufficient vertical support without having the memory and rigidity issues associated with the use of nasal or auricular cartilage. More recently, the use of an autogenous dermis fat graft has been reported, with excellent results. Both of these, however, have the disadvantage of increasing the operating room time and morbidity associated with surgery of the donor site.

Recently, human and porcine acellular dermis products have enjoyed increasing popularity. These materials, which come packaged in various sizes, provide a collagen matrix that provides vertical support to the lower lid margin and a substrate for fibrovascular ingrowth.

Choosing the right implant for a posterior spacer graft depends on the clinical situation and surgeon experience. For today’s discussion, I have been asked to focus on the use of dermis fat grafts, hard palate mucosa grafts, and acellular dermis products. Korn et al reported a series of patients who underwent placement of an autogenous dermis fat graft with excellent results. Early in my practice, I preferred an autogenous hard palate mucosa graft, but I gravitated away from this due to the difficulty in harvesting the hard palate graft, as well as the increased postoperative demand of monitoring and treating the donor site. In 2007, I started using an acellular porcine dermis product that generally produced satisfactory results, but I had several patients with prolonged postoperative inflammation. Two of these patients required removal of the implant with replacement with a hard palate graft. Subsequently, I have used an acellular human dermis product as my first-line graft with excellent results. I have observed that the thickness and overall quality of the acellular human dermis grafts has improved since the introduction of the porcine products. Alternatively, my mentor and colleague has published his results with both of these products and currently prefers the acellular porcine dermis product, reinforcing the notion that the “right implant” differs for each patient and surgeon.

Selected Readings

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